DENSO

2D Code Handy Scanner

GT10Q-SU / GT11Q-SU
GT10Q-HU / GT11Q-HU

User's Manual

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

- DENSO WAVE INCORPORATED does not assume any product liability arising out of, or in connection with, the application or use of any product, circuit, or application described herein.
- If it is judged by DENSO WAVE INCORPORATED that malfunction of the product is due to the product having been dropped or subjected to impact, repairs will be made at a reasonable charge even within the warranty period.
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Specifications are subject to change without prior notice.

FCC Regulations

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contents

Preface i
SAFETY PRECAUTIONS ii
Care and Maintenance v
Chapter 1 Names and Functions 1
Chapter 2 Preparation 2
2.1 Operating environment 2
2.2 Connecting the interface cable to the scanner 3
Chapter 3 Connection to the Host Computer--Setting up the USB Interface-- 4
3.1 Setting up the USB-COM interface 4
3.2 Setting up the USB keyboard interface 15
Chapter 4 Scanning Codes 19
Chapter 5 Customizing the Scanner 20
Chapter 6 Scanning Control 21
6.1 Trigger switch control 21
6.2 Programmable trigger switch 22
6.3 Software control 22
6.4 Auto sensing mode--Automatic detection of labels 23
Chapter 7 Magic Key Control 24
Chapter 8 Scanning Functions 26
8.1 Data verification mode 26
8.1.1 Verification setup procedure 26
8.1.2 Specifying a verification object 27
8.1.3 Verification result output 28
8.2 Editing data 29
8.2.1 Data extraction mode 29
8.2.1.1 Extracting a data string 29
8.2.1.2 Extracting data blocks 31
8.2.1.3 Extracting AI (Application Identifier)-prefixed strings 33
8.2.2 Delimited-text format conversion mode 41
8.3 Barcode reader mode 42
8.4 Point scan mode 42
8.5 Scanning a mirror image 2D code 42
8.6 Scanning a black-and-white inverted code 42
8.7 Scanning split QR Code symbols 43
8.8 Multi-line barcode scanning 44
8.8.1 Number of lines 44
8.8.2 Data output order 44
8.8.3 Output format 44
8.9 Scanning an SQRC (Security QR Code) Symbol 44
Chapter 9 Beeper, Indicator LED, Vibrator and Marker Beam 45
9.1 Beeper 45
9.2 Indicator LED 46
9.3 Vibrator 48

9.4 Marker beam 49
Chapter 10 Communication 50
10.1 USB-COM interface 50
10.2 USB keyboard interface 51
10.3 Communication format 52
Chapter 11 Image Capturing 59
11.1 Outline 59
11.2 Image capturing specifications 59
Chapter 12 Parameters and Defaults 61
Chapter 13 QR-Coded Parameter Menu 73
13.1 Parameter setting procedure using the QR-coded parameter menu 73
13.2 QR-coded parameter menu 74
Chapter 14 Troubleshooting 84
Appendix 1 Specifications 85
Appendix 2 Control Commands 86
Appendix 3 Interface Specifications 88

Preface

Please READ through this manual carefully. It will enable you to operate your scanner correctly.

After you have finished reading this manual, keep it handy for speedy reference.

Note: Do not use this scanner in an environment with electrical noise that can trigger malfunction.

Note: Specifications described in this manual are supported by GT10Q Firmware version 3.03 or later.

Note: The shape of the projected area marker differs according to the original target market.

This hand-held scanner with built-in area marker (five-point) is designed for use in the United States and Canada only and should not be used in any other country.

SAFETY PRECAUTIONS

Be sure to observe all these safety precautions.

■ Please READ through these instructions carefully. They will enable you to use the scanner correctly.

■ Always keep this manual nearby for speedy reference.

Strict observance of these warnings and cautions is a MUST for preventing accidents that could result in bodily injury and substantial property damage. Make sure you fully understand all definitions of these terms and symbols given below before you proceed to the text itself.

⚠ **WARNING**	Alerts you to those conditions which could cause serious bodily injury or death if the instructions are not followed correctly.
⚠ **CAUTION**	Alerts you to those conditions which could cause minor bodily injury or substantial property damage if the instructions are not followed correctly.

Meaning of Symbols

A triangle (△) with a picture inside alerts you to a warning of danger. Here you see the warning for electrical shock.

A diagonal line through a circle (⃠) alerts you to something you should not do; it may or may not have a picture inside. Here you see a screwdriver inside the circle, meaning that you should not disassemble.

A black circle (●) with a picture inside alerts you to something you MUST do. This example shows that you MUST unplug the power cord.

⚠ WARNING

To System Designers:

- When introducing the scanner in those systems that could affect human lives (e.g., medicines management system), develop applications carefully through redundancy and safety design which avoids the feasibility of affecting human lives even if a data error occurs.

- If smoke, abnormal odors or noises come from the scanner, immediately switch off the host computer, unplug the interface cable, and contact your nearest dealer.

  Failure to do so could cause fire or electrical shock.

- If foreign material or water gets into the scanner, immediately switch off the host computer, unplug the interface cable, and contact your nearest dealer.

  Failure to do so could cause fire or electrical shock.

- If you drop the scanner so as to affect the operation or damage its housing, switch off the host computer, unplug the interface cable, and contact your nearest dealer.

  Failure to do so could cause fire or electrical shock.

- Never bring any metals into contact with the terminals in connectors.

  Doing so could produce a large current through the scanner, resulting in heat or fire, as well as damage to the scanner.

- Never use the scanner on the line voltage other than the specified level.

  Doing so could cause the scanner to break or burn.

- Do not use the scanner where any inflammable gases may be emitted.

  Doing so could cause fire.

- Do not subject the scanning window of the scanner to direct sunlight for extended periods.

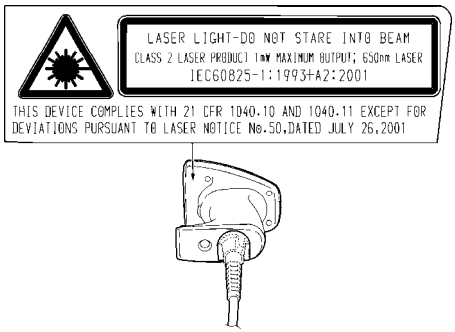
  Doing so could damage the scanner, resulting in a fire.

- The scanner uses a laser light for indicating the scan range. The intensity of laser light might be too low to inflict bodily injury. However, do not look into the laser beam.

  The scanner complies with IEC 60825-1:1993+A2:2001 and 21 CFR 1040.10, 1040.11 except for deviations pursuant to Laser notice No. 50, dated July 26,2001.

  In accordance with Clause 5, IEC 60825-1, the following information is provided to the user:

  LASER LIGHT
  DO NOT STARE INTO BEAM
  CLASS 2 LASER PRODUCT


LASER LIGHT-DO NOT STARE INTO BEAM
CLASS 2 LASER PRODUCT 1mW MAXIMUM OUTPUT; 650nm LASER
IEC60825-1:1993+A2:2001
THIS DEVICE COMPLIES WITH 21 CFR 1040.10 AND 1040.11 EXCEPT FOR DEVIATIONS PURSUANT TO LASER NOTICE No.50,DATED JULY 26,2001

Caution – Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser light exposure.

⚠ CAUTION

- Do not put the scanner on an unstable or inclined plane.
  The scanner may drop, creating injuries.

- Never put the scanner in places where there are excessively high temperatures, such as inside closed-up automobiles, or in places exposed to direct sunlight.
  Doing so could affect the housing or parts, resulting in a fire.

- Avoid using the scanner in extremely humid areas, or where there are drastic temperature changes.
  Moisture will get into the scanner, resulting in malfunction, fire or electrical shock.

- Do not place the scanner anyplace where it may be subjected to oily smoke or steam, e.g., near a cooking range or humidifier.
  Doing so could result in a fire or electrical shock.

- Never disassemble or modify the scanner; doing so could result in an accident such as break or fire.
  Doing so could result in a fire or electrical shock.

Never disassemble

- Never cover or wrap up the scanner in a cloth or blanket.
  Doing so could cause the scanner to heat up inside, deforming its housing, resulting in a fire.
  Always use the scanner in a well-ventilated area.

- Do not scratch or modify the scanner or its interface cable. Do not bend, twist, pull, or heat the cable.
  Doing so could damage the scanner or its interface cable, creating a fire hazard.

- Do not put heavy material on the scanner or its interface cable, or allow the cable to get pressed under heavy material.

- Do not look into the light source from the scanning window or do not point the scanning window at other people's eyes.
  Eyesight may be damaged by direct exposure to this light.

- Do not use the scanner if your hands are wet or damp.
  Doing so could result in an electrical shock.

- Never use chemicals or organic solvents such as benzene and thinner to clean the housing. Do not apply insecticide to the scanner.
  Doing so could result in a marred or cracked housing, electrical shock or fire.

- Do not use the scanner with anti-slip gloves containing plasticizer.
  The scanner housing may be broken, creating injuries, electrical shock, or fire.

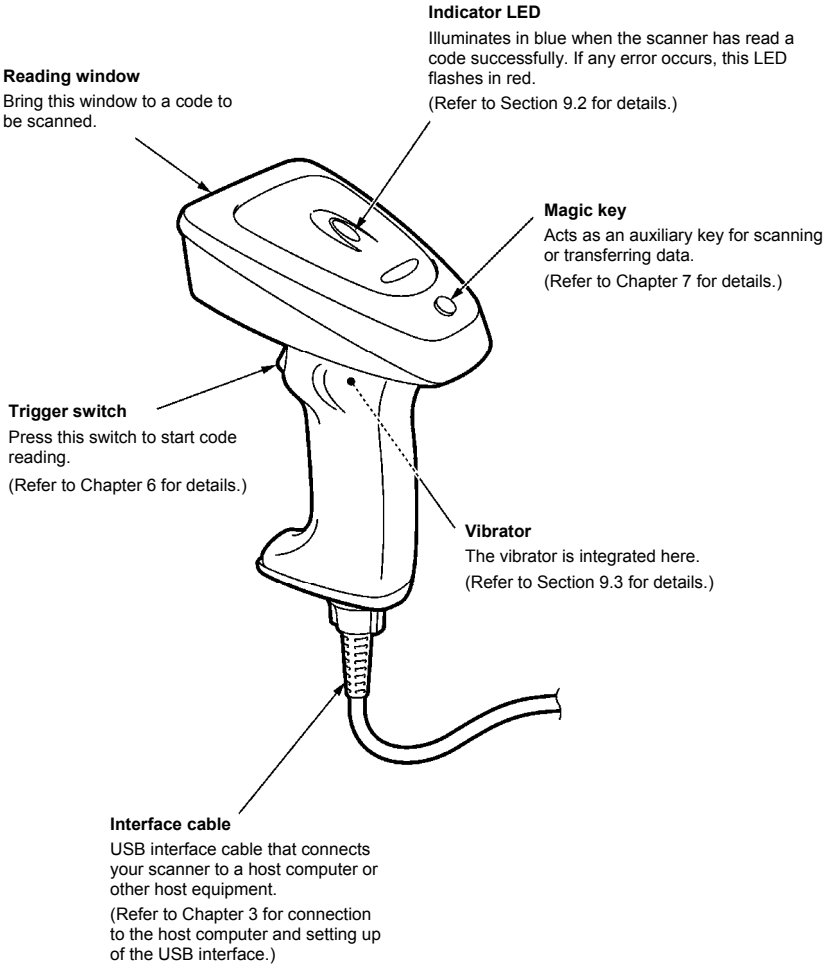
- If the interface cable is damaged (e.g., exposed or broken lead wires), stop using it and contact your nearest dealer.
  Failure to do so could result in a fire or electrical shock.

Care and Maintenance

Dust or dirt accumulating on the clear plate of the code reading window will affect reading performance. If you use the scanner in dusty areas, therefore, periodically check the clear plate and clean it if dusty.

- To clean the plate, first blow the dust away with an airbrush. Then wipe the plate with a cotton swab or the similar soft one gently.
- If sand or hard particles have accumulated, never rub the plate; doing so will scratch or damage it. Blow the particles away with an airbrush or a soft brush.

Chapter 1 Names and Functions


Indicator LED
Illuminates in blue when the scanner has read a code successfully. If any error occurs, this LED flashes in red.
(Refer to Section 9.2 for details.)
Reading window
Bring this window to a code to be scanned.
Magic key
Acts as an auxiliary key for scanning or transferring data.
(Refer to Chapter 7 for details.)
Trigger switch
Press this switch to start code reading.
(Refer to Chapter 6 for details.)
Vibrator
The vibrator is integrated here.
(Refer to Section 9.3 for details.)
Interface cable
USB interface cable that connects your scanner to a host computer or other host equipment.
(Refer to Chapter 3 for connection to the host computer and setting up of the USB interface.)

Chapter 2 Preparation

2.1 Operating environment

The scanner requires a host computer equipped with a USB port. The operating environment differs depending upon whether you use the USB-COM interface or USB keyboard interface as listed below.

USB-COM interface:

To use this interface, you need to install the dedicated USB-COM device driver (virtual COM port driver) to the host computer. This interface allows you to use the scanner in applications using the conventional serial port. For instructions how to set up the device driver, refer to Chapter 3, Section 3.1. For the interface specifications, refer to Chapter 10, Section 10.1.

This interface is selected by default.

USB keyboard interface:

No dedicated USB device driver is required. Via this interface, data scanned by the scanner can be entered to the cursor position in your application. For instructions how to set up the device driver, refer to Chapter 3, Section 3.2. For the interface specifications, refer to Chapter 10, Section 10.2.

<table>
<tr><th></th><th>To use the USB-COM interface (factory default):</th><th>To use the USB keyboard interface:</th></tr>
<tr><td>Host computer</td><td colspan="2">PC/AT or AT/AT compatible PC equipped with a USB port</td></tr>
<tr><td rowspan="2">Operating System (OS)</td><td>Windows 98SE</td><td>Windows 98/98SE</td></tr>
<tr><td colspan="2">Windows Me
Windows 2000 Professional
Windows XP Home/Professional</td></tr>
<tr><td>USB driver</td><td>USB-COM device driver
provided by DENSO WAVE</td><td>OS-supplied device driver</td></tr>
</table>

Note: The scanner cannot be used on Windows NT that does not support any USB device.

Using the QR-coded parameter menu (provided in Chapter 13) or the configuration software (ScannerSetting_2D)* can switch between the USB-COM interface and USB keyboard interface. Connecting the scanner's USB interface cable to the host computer or USB hub while holding down the magic key also switches from the current interface to another one; from the USB-COM interface to USB keyboard interface, or vice versa.

The interface setting will be retained even if the power is off.

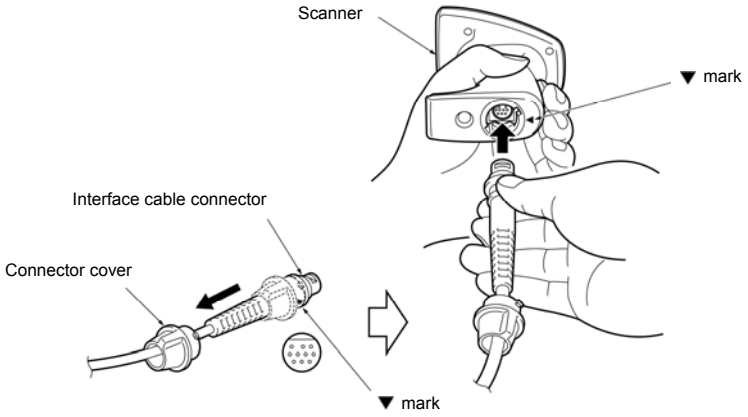
* The configuration software (ScannerSetting_2D) is available as free downloads from our website at http://www.denso-wave.com/.

2.2 Connecting the interface cable to the scanner

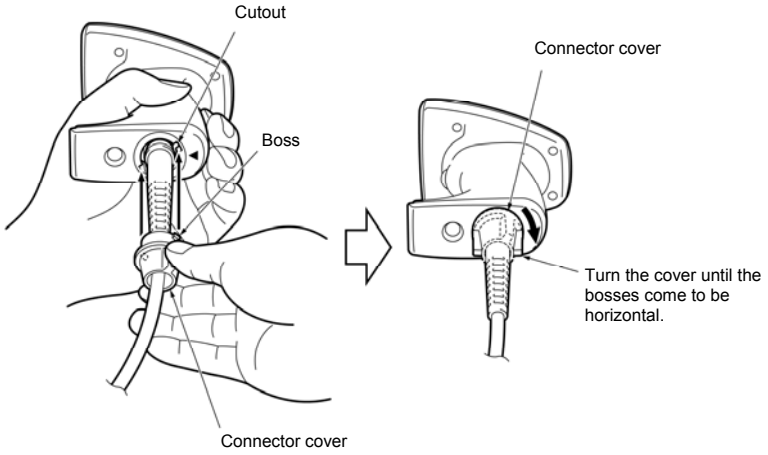
(1) Pull the connector cover of the interface cable off its connector as shown below.

(2) Plug the interface cable connector into the connector located in the bottom of the scanner.

Note: As shown below, hold the scanner body, align the ▼ mark on the cable connector with that on the scanner, and fully insert the interface cable connector.



(3) Align the two bosses on the connector cover with cutouts in the scanner body, fit the connector cover into the scanner, and turn it clockwise to lock it.



Chapter 3 Connection to the Host Computer--Setting up the USB Interface--

The scanner receives and sends data from/to the host computer through the USB-COM interface or USB keyboard interface. You need to set up the device driver designed for the interface to be used.

Notes for connecting the USB interface cable

- When plugging and unplugging the USB connector, put an interval of at least 10 seconds between those actions since Windows may take several to 10 seconds to add or delete the USB device.
- Hot plugging/unplugging is allowed for USB devices. However, do not plug or unplug the USB connector when:
  - The computer is on standby (in suspend mode) or
  - The COM port is open with the USB-COM interface being used. (Hot plugging/unplugging under this condition may not only lose data but affect the system badly.)
- When the host computer is processing the scanner connection, do not plug or unplug any other USB device cables.
- Never disconnect the USB interface cable when the scanner is communicating. Doing so will not only lose data but affect the system badly.
- Directly connect the scanner to the USB port on the host computer or to the self-powered hub. The scanner may not be connected to some types of hubs. If the operation of the hub-connected scanner is unstable, connect it directly to any USB port on the host computer.
- Do not use any extension cord.

3.1 Setting up the USB-COM interface

Using the USB-COM interface requires installing the USB-COM device driver provided by DENSO WAVE to the host computer. The driver can be downloaded for free from our website at:
http://www.denso-wave.com/

The file downloaded contains the USB-COM device driver and uninstaller which are compressed. It is a self-extracting file. Store the file into a folder and then double-click its icon to extract it.

Connecting the USB interface cable to the host's USB port or USB hub automatically runs the system-supplied driver setup wizard on the host computer. Follow the wizard and install the USB-COM device driver.

The setup procedure on each of Windows 98SE, Windows Me, Windows 2000, and Windows XP is described on the following pages.

Notes for installing the USB-COM device driver

- If our USB-COM device driver has not been installed on your computer, do not connect the scanner to the USB port before or when you switch the computer on. Connecting it at such timing will start installing our USB device driver during booting, so the driver installation may not be completed successfully.
- If it is impossible to install our USB-COM device driver, any similar USB device driver may have been already installed on your computer. If it has, remove the USB device driver from the device manager and reinstall our USB-COM device driver. Note that before the removal, you should confirm that the currently installed USB device driver is not used for other USB devices.
- If you are using any DENSO WAVE USB device operated by our USB-COM device driver, no driver installation is required since the USB-COM device driver already installed on your computer will be automatically used.

  If you want to install a new USB-COM device driver, uninstall the previously installed similar driver using the dedicated uninstaller before installing a new one.
- Store the Windows 98SE/Me device driver file (dwcom9x.ini, dwcom9x.sys, dwport.ini, and dwport.vxd) and Windows 2000/XP device driver file (dwcom.ini and dwcom.sys) in separate folders. (That is, do not extract those driver files in the same folder.)

- When installing device drivers, be sure to specify the driver designed for the Windows version running on the host computer. Installing any driver designed for different Windows versions might damage the system.

  < If you have installed or attempted to install any wrong driver: >

  Windows 98SE: Choose View | Options and select "Show hidden files."

  Windows Me/2000/XP: Choose Tools | Folder Options and select "Show hidden files and folders" and clear the "Hide protected operating system files" check box.

  And then, follow the recovery procedure given below.

  - If you have installed the device driver designed for Windows 2000/XP family to Windows 98SE/Me:

  The wrong device will be marked with ! when the Windows device manager is opened. Remove the wrong device with the following steps:

  1) Remove !DENSO WAVE USB-COM Port from the device manager.
  2) Remove the following files if any at the following locations:

C:\Windows\Inf\Other\	DENSO WAVEdwcom.inf
C:\Windows\Inf\	Dwcom.inf, Dwcom.pnf, Dwcom9x.inf, Dwcom9x.pnf, Dwport.inf, Dwport.pnf
C:\Windows\System\	Dwport.vxd
C:\Windows\System32\drivers\	Dwport.sys

  3) Reboot the host computer.

  - If you attempted to install the device driver designed for Windows 98 family to Windows 2000/XP:

  Windows 2000/XP issued an error and rejected the driver installation. To recover from the error state, perform the following steps:

  1) Remove !USB Device GT10Q-SU/HU from the device manager.
  2) Remove Oem*.inf files having the same contents of Dwcom9x.inf from C:\Winnt\Inf folder. (To find those files, open the Dwcom9x.inf file stored on the installer CD using Note Pad and copy the character string(s) on the top line, open the \Winnt\Inf folder, click **Search** on the tool bar, paste the string(s) into the **Containing text** box, and click **Search Now.)**
  3) Remove Oem*.pnf files (a compiled file of the Oem*.inf files), where * is the same number as Oem*.inf files.
  4) Remove the following files if any at the following locations:

C:\Winnt\Inf\	Dwcom.inf, Dwcom.pnf, Dwcom9x.inf, Dwcom9x.pnf, Dwport.inf, Dwport.pnf
C:\Winnt\System\	Dwport.vxd
C:\Winnt\System32\drivers\	Dwcom9x.sys

  Note: For Windows XP, read C:\Winnt\… as C:\Windows\…

  5) Reboot the host computer.

  After completion of the procedure above, reinstall our USB-COM device driver.

- In Windows 2000/XP, before unplugging the USB interface cable, use the Hardware wizard in the Control Panel to stop the device.

When configuring the COM port:

- In Windows 2000/XP, if you connect the scanner to your computer first time or have changed the COM port for the scanner or hub, then confirm the COM port number on the Windows device manager or the like before use.
- Windows 98SE/Me will automatically assign the COM port number according to the OS specifications so that the port number cannot be fixed. This may cause the COM port number to be changed at the time of next rebooting of the host computer if (1) you have connected the scanner to the COM port first time or (2) you have changed the configuration as given below:

  - Changing the number of the scanner units connected to the COM ports
  - Changing the COM port to which the scanner or hub is connected.

  In such a case, reboot the host computer, open the device manager, and check the COM port number actually assigned by OS before use.
- To use two or more communications processors (software) or scanners concurrently on your computer, be sure to assign a unique COM port to each of them.

Installation procedure

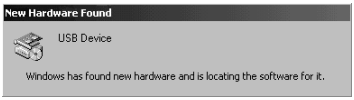
Follow the procedure shown below to install the USB-COM device driver that comes with the scanner in a CD-ROM.

- The CD-ROM includes drivers for Windows 98SE/Me and those for Windows 2000/XP, and an exclusive uninstaller which can be commonly used with all Windows versions.
- To uninstall these drivers, use the exclusive uninstaller.
- For Windows 2000/XP, administrative permission (Administrator Login) is necessary to install/uninstall drivers.

Windows 98SE

(1) Switch your computer on to run Windows 98SE.

(2) Double-click the driver icon to extract it.

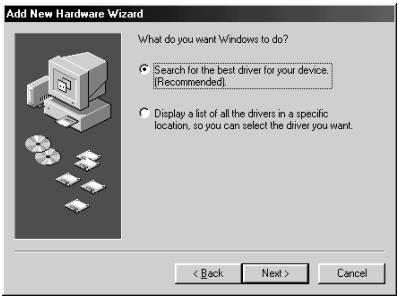


(3) Connect the scanner's USB interface cable to the computer or USB hub, and the "New Hardware Found" appears.

Add New Hardware Wizard
This wizard searches for new drivers for:
USB Composite Device
A device driver is a software program that makes a hardware device work.
< Back
Next >
Cancel

(4) The Add New Hardware Wizard starts.

Click **Next** to proceed.


Add New Hardware Wizard
What do you want Windows to do?
Search for the best driver for your device. (Recommended).
Display a list of all the drivers in a specific location, so you can select the driver you want.
< Back
Next >
Cancel

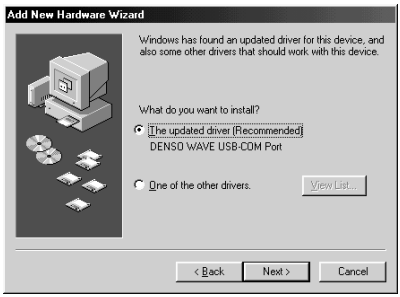
(5) Select **Search for the best driver for your device. (Recommended)**, then click **Next**.

Add New Hardware Wizard
Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.
Floppy disk drives
CD-ROM drive
Microsoft Windows Update
Specify a location:
D:\DRIVER\WIN9X
Browse...
< Back
Next >
Cancel

(6) Select the **Specify a location** check box, specify the folder ("WIN9X") where extracted drivers for Windows 98SE/Me are located (or click **Browse** to specify it), and then click **Next**.

NOTE: Do not specify any folder other than "WIN9X." Doing so may affect the system badly.

NOTE: This sample assumes that the drivers have been extracted in D:\DRIVER. You need to specify the folder where you have actually extracted the drivers.


Add New Hardware Wizard
Windows has found an updated driver for this device, and also some other drivers that should work with this device.
What do you want to install?
The updated driver (Recommended)
DENSO WAVE USB-COM Port
One of the other drivers.
View List...
< Back
Next >
Cancel

(7) If "DENSO WAVE USB-COM Port" is found as "**The updated driver (Recommended)**", then click **Next**.

Add New Hardware Wizard
Windows driver file search for the device:
DENSO WAVE USB-COM Port
Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.
Location of driver:
D:\DRIVER\WIN9X\DWCOM9X.INF
< Back
Next >
Cancel

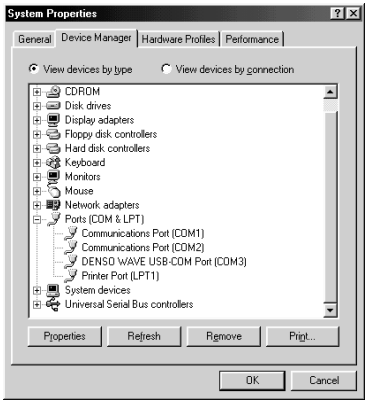
(8) If this screen appears showing that Windows is now ready to install the best driver for the DENSO WAVE USB-COM Port, then click **Next**.

Add New Hardware Wizard
DENSO WAVE USB-COM Port
Windows has finished installing the software that your new hardware device requires.
< Back
Finish
Cancel

(9) If this screen appears, click **Finish**.

When copying driver files is finished, "New Hardware Found" messages for "Unknown device" and "DENSO WAVE USB-COM Port" appear in this order.

All installation processes are completed.



(10) To make sure that the USB-COM device driver has been successfully installed, open the Windows' Device Manager.

If **DENSO WAVE USB-COM Port** is added to the sub-tree of **Ports (COM & LPT)** as shown at left, the scanner is connected normally.

If the device is not added or it is marked with ! or ×, remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

Windows Me

(1) Switch your computer on to run Windows Me.

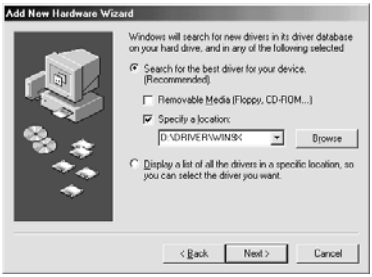
(2) Double-click the driver icon to extract it.

(3) Connect the scanner's USB interface cable to the computer or USB hub, and the "USB Device" is found as a new hardware device.

Add New Hardware Wizard
Windows has found the following new hardware:
USB Device
Windows can automatically search for and install software that supports your hardware. If your hardware came with installation media, insert it now and click Next.
What would you like to do?
Automatic search for a better driver (Recommended)
Specify the location of the driver (Advanced)
< Back
Next >
Cancel

(4) The Add New Hardware Wizard starts.

Select **Specify the location of the driver. (Advanced)**, then click **Next**.


Add New Hardware Wizard
Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected
Search for the best driver for your device. (Recommended)
Removable Media (Floppy, CD-ROM...)
Specify a location:
D:\DRIVER\WIN9X
Browse
Display a list of all the drivers in a specific location, so you can select the driver you want.
< Back
Next >
Cancel

(5) Select the **Specify a location** check box, specify the folder ("WIN9X") where extracted drivers for Windows 98SE/Me are located (or click **Browse** to specify it), and then click **Next**.

NOTE: Do not specify any folder other than "WIN9X." Doing so may affect the system badly.

NOTE: This sample assumes that the drivers have been extracted in D:\DRIVER. You need to specify the folder where you have actually extracted the drivers.

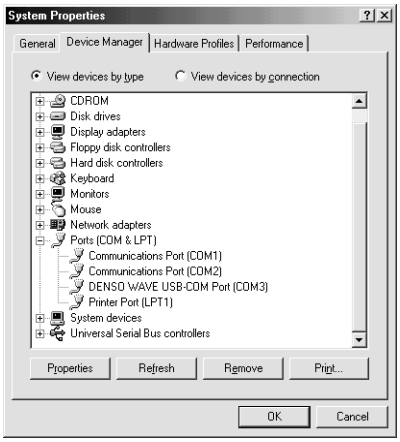
Add New Hardware Wizard
Windows driver file search for the device:
DENSO WAVE USB-COM Port
Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.
Location of driver:
A:\DRIVER\WIN9X\DWCOM9X.INF
< Back
Next >
Cancel

(6) If this screen appears showing that Windows is now ready to install the best driver for the DENSO WAVE USB-COM Port, then click **Next**.

(7) If this screen appears, click **Finish**.

When copying driver files is finished, "New hardware found" messages for "Unknown device" and "DENSO WAVE USB-COM Port" appear in this order.

All installation processes are completed.



(8) To make sure that the USB-COM device driver has been successfully installed, open the Windows' Device Manager.

If **DENSO WAVE USB-COM Port** is added to the sub-tree of **Ports (COM & LPT)** as shown at left, the scanner is connected normally.

If the device is not added or it is marked with ! or x, remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

Windows 2000

(1) Switch your computer on to run Windows 2000. Log on as an Administrator.

(2) Double-click the driver icon to extract it.

(3) Connect the scanner's USB interface cable to the computer or USB hub, and the "Found New Hardware" appears.

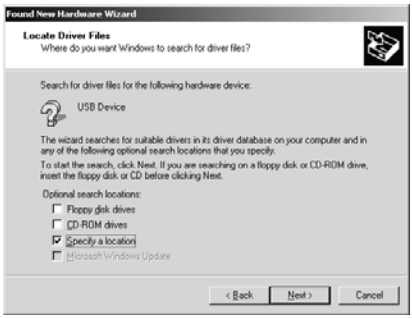
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

(4) The Found New Hardware Wizard starts.

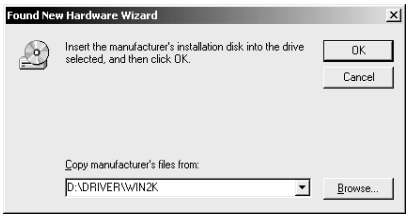
Click **Next** to proceed.

Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
USB Device
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

(5) Select **Search for a suitable driver for my device (recommended)**, then click **Next**.


Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
USB Device
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

(6) Select the **Specify a location** check box, then click **Next**.



(7) Specify the folder ("WIN2K") where extracted drivers for Windows 2000/XP are located (or click **Browse** to specify it), and then click **OK**.

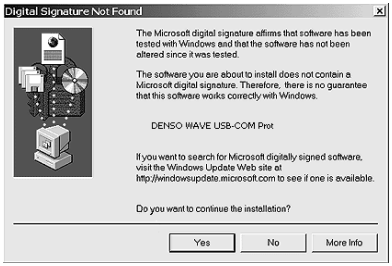
NOTE: Do not specify any folder other than "WIN2K." Doing so may affect the system badly.

NOTE: This sample assumes that the drivers have been extracted in D:\DRIVER. You need to specify the folder where you have actually extracted the drivers.

Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
USB Device
Windows found a driver for this device. To install the driver Windows found, click Next.
d:\driver\win2k\dwcom.inf
< Back
Next >
Cancel

(8) Wait for the screen shown at left to appear and check that the \DRIVER¥WIN2K\DWCOM.INF is found, then click **Next**.

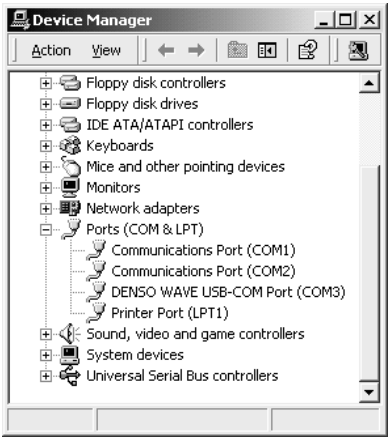
(This sample shows that the dwcom.inf is stored in D:\DRIVER\WIN2K.)


Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
DENSO WAVE USB-COM Port
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

(9) Even if the "Digital Signature Not Found" appears, you must continue this installation. Click **Yes**.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
DENSO WAVE USB-COM Port
Windows has finished installing the software for this device.
To close this wizard, click Finish.
< Back
Finish
Cancel

(10) If the completion screen appears, click **Finish**.



(11) To make sure that the USB-COM device driver has been successfully installed, open the Windows' Device Manager.

If **DENSO WAVE USB-COM Port** is added to the sub-tree of **Ports (COM & LPT)** as shown at left, the scanner is connected normally.

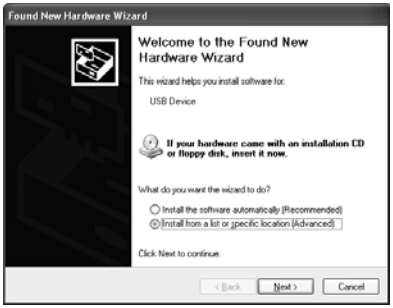
If the device is not added or it is marked with ! or X, remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

Windows XP

(1) Switch your computer on to run Windows XP. Log on as an Administrator.

(2) Double-click the driver icon to extract it.

(3) Connect the scanner's USB interface cable to the computer or USB hub, and the "Found New Hardware" appears on the task tray.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
USB Device
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

(4) The Found New Hardware Wizard starts.

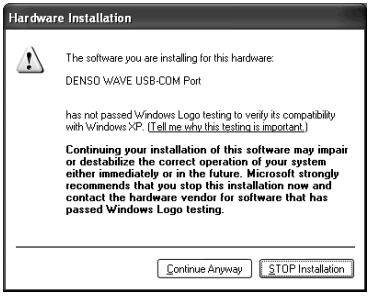
Select **Install from a list or specific location. (Advanced)**, then click **Next**.

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
D:\DRIVER\WIN2K
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

(5) Select **Search for the best driver in these locations** and **Include this location in the search** check box, then specify the folder ("WIN2K") where drivers for Windows 2000/XP are located (or click **Browse** to specify it), and then click **Next**.

NOTE: Do not specify any folder other than "WIN2K." Doing so may affect the system badly.

NOTE: This sample assumes that the drivers have been extracted in D:\DRIVER. You need to specify the folder where you have actually extracted the drivers.


Hardware Installation
The software you are installing for this hardware:
DENSO WAVE USB-COM Port
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

(6) Even if the caution about Windows Logo testing (WHQL) appears, you must continue this installation. Click **Continue Anyway**.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
DENSO WAVE USB-COM Port
Click Finish to close the wizard.
< Back
Finish
Cancel

(7) If the completion screen appears, click **Finish**.

(8) When copying driver files is finished, the hint message "Found New Hardware" appears on the task tray.

All installation processes are completed.

(9) To make sure that the USB-COM device driver has been successfully installed, open the Windows' Device Manager.

If **DENSO WAVE USB-COM Port** is added to the sub-tree of **Ports (COM & LPT)** as shown at left, the scanner is connected normally.

If the device is not added or it is marked with ! or ×, remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

3.2 Setting up the USB keyboard interface

The USB keyboard interface requires the USB device class driver for HID (Human Interface Device) which is included in Windows 98 or later Operating Systems and whose setup wizard will automatically run. You do not need to install the device driver.

Note: If the USB-COM interface is set up, switch it to the USB keyboard interface by scanning the "USB keyboard interface" QR Code symbol given in Section 13.2 with the parameter setting procedure in Section 13.1.

Connecting the USB interface cable to the host's USB port or USB hub automatically runs the system-supplied driver setup wizard. Follow the wizard and set up the driver. The setup procedure on each of Windows 98/98SE, Windows Me, Windows 2000, and Windows XP is described below.

Windows 98/98SE

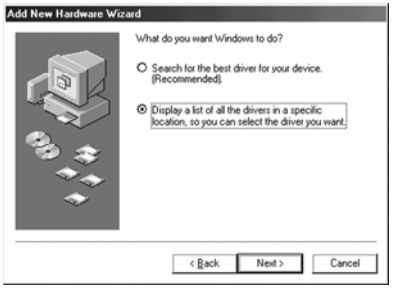
(1) Switch the computer on to run Windows 98/98SE.

(2) Connect the scanner interface cable to the computer or USB hub.

Add New Hardware Wizard starts.

Add New Hardware Wizard
This wizard searches for new drivers for:
USB Human Interface Device
A device driver is a software program that makes a hardware device work.
< Back
Next >
Cancel

(3) Click **Next** to proceed.


Add New Hardware Wizard
What do you want Windows to do?
Search for the best driver for your device. (Recommended).
Display a list of all the drivers in a specific location, so you can select the driver you want.
< Back
Next >
Cancel

(4) Select the "**Display a list of all the drivers in a specific location, so you can select the driver you want.**" and click **Next**.

Add New Hardware Wizard
Select the manufacturer and model of your hardware device. If you have a disk that contains the updated driver, click Have Disk. To install the updated driver, click Finish.
Models:
USB Human Interface Device (4-23-1999)
Show compatible hardware.
Show all hardware.
Have Disk...
< Back
Next >
Cancel

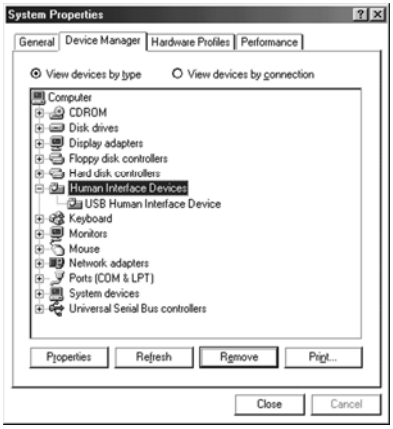
(5) Wait for the screen shown at left to appear, select "USB Human Interface Device," and click **Next**.

Add New Hardware Wizard
Windows driver file search for the device:
USB Human Interface Device
Windows is now ready to install the selected driver for this device. Click Back to select a different driver, or click Next to continue.
Location of driver:
C:\WINDOWS\INF\HIDDEV.INF
< Back
Next >
Cancel

(6) Wait for the screen shown at left to appear and click **Next**.

Add New Hardware Wizard
USB Human Interface Device
Windows has finished installing the software you selected that your new hardware device requires.
< Back
Finish
Cancel

(7) Wait for the screen shown at left to appear and click **Finish** to return to Windows.



(8) To check whether the USB device is working normally, open the Windows' Device Manager.

If **USB Human Interface Device** is added to the sub-tree of **Human Interface Devices** as shown at left, the scanner is connected normally.

If the device is not listed or it is marked with ! or ×, perform the above connection process again from the beginning.

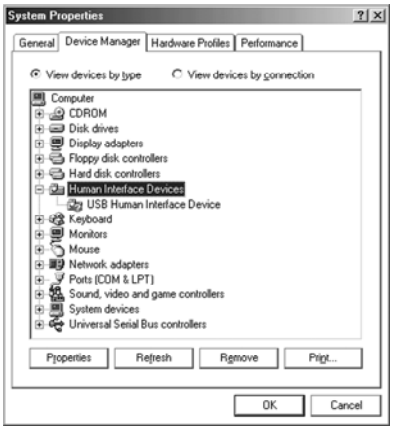
Windows Me

(1) Switch the computer on to run Windows Me.

(2) Connect the scanner interface cable to the computer or USB hub.

(3) Wait for **New Hardware Found** wizard to start.

Windows will automatically configure the scanner. Upon completion of the configuration, the screen shown at left automatically disappears.



(4) To check whether the USB device is working normally, open the Windows' Device Manager.

If **USB Human Interface Device** is added to the sub-tree of **Human Interface Devices** as shown at left, the scanner is connected normally.

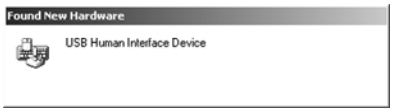
If the device is not listed or it is marked with !, the device is not working normally. Perform the connection process above again. If marked with ×, the device is disabled, so enable it in the **Property** dialog. If marked with a ?, the device is working normally*.

* The scanner is designed to work with the default device driver of Windows Me but the device name is not officially registered to the driver, so the device is marked with an ?. There is no problem with driver operation.

Windows 2000

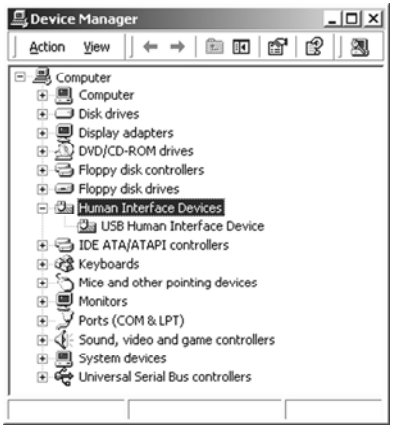
(1) Switch the computer on to run Windows 2000. Log on as an Administrator.

(2) Connect the scanner interface cable to the computer or USB hub.



(3) Wait for **Found New Hardware** wizard to start.

Windows will automatically configure the scanner. Upon completion of the configuration, the screen shown at left automatically disappears.



(4) To check whether the USB device is working normally, open the Windows' Device Manager.

If **USB Human Interface Device** is added to the sub-tree of **Human Interface Devices** as shown at left, the scanner is connected normally.

If the device is not added or it is marked with ! or ×, remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

Windows XP

(1) Switch the computer on to run Windows XP. Log on as an Administrator.

(2) Connect the scanner interface cable to the computer or USB hub.

(3) Wait for the **Found New Hardware** hint to pop up on the Windows task tray.

Windows will automatically configure the scanner. Upon completion of the configuration, the screen shown at left automatically disappears.

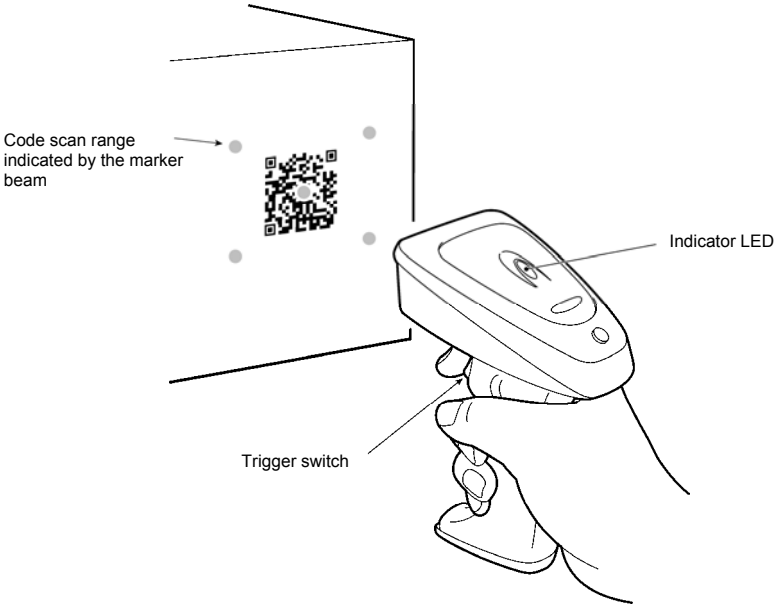
(4) To check whether the USB device is working normally, open Windows' Device Manager.

If **USB Human Interface Device** is added to the sub-tree of **Human Interface Devices** as shown at left, the scanner is connected normally.

If the device is not added or it is marked with ! or X, remove this driver with the uninstaller, reboot your computer, and perform the above connection process again.

(1) Bring the reading window to a target code and press the trigger switch. The marker beam comes on, indicating the scan range. Align the center of the marker beam with that of the target code.

(This step is not required in continuous reading modes 1, 2 and auto sensing mode.)



(2) Wait for the indicator LED to turn green, the beeper to sound and the vibrator to operate, indicating a successful read.

Note: The actual scan range is narrower than the marker range. The scan range is approx. 2.4" (6 cm) wide by 1.6" (4 cm) high when the scanning distance is approx. 3.9" (10 cm).

Note: The marker range should only be used as a guide. It does not assure that a code within the marker range can be read.

Note: Allow only a single code to come within the scan range except when the multi-line code scanning is allowed. If two or more codes fall within the scan range at the same time, the scanner may fail to read or read those codes in alternation.

Note: The scanner can read codes omnidirectionally. Note that a target code plus its margin should lie within the scan range.

Note: If the scanner fails to read due to specular effects or other factors, change the scanning angle of the reading window or the distance from the codes, and repeat the process. (Specular effects occur when the reflection of the light from the label surface is too strong, such as when the reflecting surface is polished or covered with vinyl.)

■ Scanning mode

Regular read mode	This mode transfers the code data when the scanner has read the code successfully.
Data verification mode	This mode verifies the code data against the master data stored in the scanner. (Refer to Chapter 8, Section 8.1 for details.)

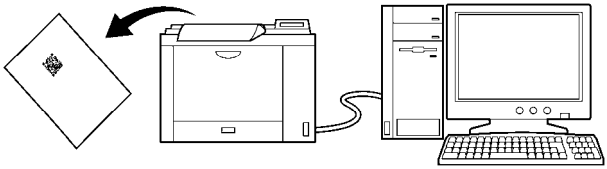
Chapter 5 Customizing the Scanner

You can customize the scanner by modifying communications conditions, readable code types, and other scanner parameters with the QR-coded parameter menu or the configuration software ScannerSetting_2D*. These parameters retain their settings even when the power is off.

(1) Scanning parameter setting QR Code symbols in the **QR-coded parameter menu** by pressing the trigger switch.
(The QR-coded parameter menu is given in Chapter 13.)

(2) Using the **configuration software (ScannerSetting 2D)*** in your computer.

The configuration software also offers batch-process QR Code printouts for ready by scanners in the field. Those printouts can be scanned by the scanner.



Note: Selecting the USB keyboard interface disables the configuration software.

* The configuration software (ScannerSetting_2D) can be downloaded for free from our website at http://www.denso-wave.com/.

Chapter 6 Scanning Control

Two types of scanning controls are available--Trigger switch control and Software control.

Trigger switch control: Pressing the trigger switch readies the scanner for scanning. (Refer to Section 6.1.)

Software control: Instead of pressing the trigger switch, you send control commands from the host computer via the USB interface to ready the scanner for scanning or put the scanner on standby. (Refer to Section 6.3.)

6.1 Trigger switch control

Pressing the trigger switch turns on the illumination LEDs and readies the scanner for scanning. The scanner supports the following five trigger switch operating modes. Select the one that best meets your needs using the QR-coded parameter menu or the configuration software (ScannerSetting_2D).

(1) Auto-off mode

Holding down the trigger switch lights the illumination LEDs for a maximum of 5 seconds, during which the scanner is ready to scan.

When a code is read successfully or approx. 5 seconds have elapsed, the illumination LEDs automatically go off and the scanner switches to standby.

If the trigger switch is released within approx. 5 seconds, the scanner switches to standby.

(2) Momentary switching mode

Only while you hold down the trigger switch, the illumination LEDs light and the scanner is ready to scan.

When you release the trigger switch or a code is read successfully, the illumination LEDs go off and the scanner switches to standby.

(3) Alternate switching mode

Each time you press the trigger switch, the scanner toggles between the ready-to-scan and standby states.

(4) Continuous reading mode 1

When you turn the scanner on, the scanner lights the illumination LEDs and becomes ready to scan. The scanner ignores all trigger switch input.

If the scanner receives the Z, READOFF or LOFF command, it switches to standby; if it receives the R, READON or LON command, it becomes ready to scan.

You can select whether or not the scanner transmits the ERROR command when the scanner cannot complete scanning and switches to standby, using the configuration software (ScannerSetting_2D).

(5) Continuous reading mode 2

This mode is functionally equivalent to the continuous reading mode 1, except that the scanner waits for a command upon completion of scanning. To become ready to scan, the scanner should receive the Z, READOFF or LOFF command to switch to standby and then receive the R, READON or LON command.

You can select whether or not the scanner transmits the ERROR command when the scanner cannot complete scanning and switches to standby, using the configuration software (ScannerSetting_2D).

Note: When you are setting parameters using the QR-coded parameter menu, the scanner is always in the auto-off mode regardless of the trigger switch operating mode selected.

Note: The trigger switch is disabled as long as the scan lock (refer to Chapter 8, Section 8.1.3) is in effect in the data verification mode.

6.2 Programmable trigger switch

The configuration software (ScannerSetting_2D) provides a choice of three functions each for the fully depressed and halfway positions of the trigger switch.

Scan: The switch position turns on the marker beam and scans a code.

Marker: The switch position turns on the marker beam.

None: The switch position does nothing.

Note, however, that the setting for the halfway position overrides the one for the fully depressed position if it has a higher priority--that is, appears earlier in the above list. Specifying "Scan" for the halfway position and "Marker" for the fully depressed position, for example, produces scanning for both positions.

6.3 Software control

You can control the scanner by sending scanning control commands from the host computer via the USB interface, instead of pressing the trigger switch.

Scanning control commands include R, READON, LON, Z, READOFF and LOFF and are restricted by the trigger switch operating modes, as listed below.

(√ : Command valid)

Commands	Description	Trigger switch operating modes				
		Auto-off mode	Momentary switching mode	Alternate switching mode	Continuous reading mode 1	Continuous reading mode 2
R, READON, LON	Ready-to-scan commands Upon receipt of one of these commands, the scanner lights the illumination LEDs and becomes ready to scan.	--	--	--	√	√
Z, READOFF, LOFF	Standby commands Upon receipt of one of these commands, the scanner turns off the illumination LEDs and switches to standby.	--	--	--	√	√

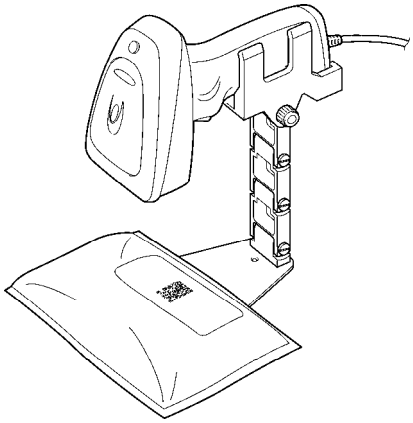
Each of these commands should be enclosed with a header and terminator for transmission according to the communications conditions of the scanner.

6.4 Auto sensing mode--Automatic detection of labels

In auto sensing mode, bringing a code label within the scan range of the reading window turns on the illumination LEDs and makes the scanner read the code. No trigger switch operation is required. Use this mode when the scanner is stationary to a stand and a code label is moved.

The illumination LEDs come on when you bring a code label within the designated range or move a code label within the same range. These LEDs go off when a code label is moved away from the range or stays within the range without move for approx. 3 seconds.

The scanner offers a choice of three sensitivity levels for responding to codes. Switch to a higher sensitivity level if the illumination LEDs will not come on when a code is brought into the range, for example.



Note: Even if you do not bring a code label within the scan range, the illumination LEDs may come on when the ambient level of light changes or any shadows move within the scan range.

Note: To enable the scanner to work properly in the auto sensing mode, an ambient illuminance of at least 500 lx is required.

Chapter 7 Magic Key Control

The magic key can act as an auxiliary key for scanning or data transfer. You can assign any of the following six functions or no function at all to the magic key. Select the function that best meets your needs using the configuration software (ScannerSetting_2D).

(1) Readable code switching function

Each time you press the magic key, the scanner switches between two readable codes selected in advance with the configuration software (ScannerSetting_2D).

Using this function allows the scanner to also read codes that you have disabled for scanning.

Pressing the magic key five times within 2 seconds temporarily disables this function to allow the scanner to read codes other than the two pre-selected codes. Pressing the magic key again re-enables this function.

(2) Data retransfer function

Pressing the magic key retransfers the last data sent. Note, however, that the scanner ignores this command if there is no such data available--that is, if you have turned off the power since the last read operation.

(3) Specific character transfer function

Pressing the magic key transfers a character sequence (max. 10 bytes) specified with the configuration software (ScannerSetting_2D).

(4) Ready/standby switching function

When continuous reading mode 1 or 2 is selected as a trigger switch operating mode, pressing the magic key switches the scanner state between standby and ready-to-scan.

If the notification of a reading failure function is enabled, switching from ready to standby state before scanning is completed will send the ERROR command to the host computer.

(5) Marker mode switching function

Pressing the magic key switches the marker mode between the "Always ON" and the current marker setting.

(6) Barcode reader mode switching function

Pressing the magic key switches between the normal reader mode and barcode reader mode (see Section 8.3) regardless of the current barcode reader mode setting (enabled or disabled). In the barcode reader mode, the point scan mode (see Section 8.4) becomes disabled, even if it has been enabled with the configuration software (ScannerSetting_2D).

(7) No function

If no function has been assigned to the magic key, pressing the key produces no operation.

The following table lists the relationship between the magic key functions and trigger switch operating modes. (It applies to both the regular read mode and data verification mode.) The "--" indicates that the scanner ignores the magic key functions assigned. In auto-off mode, for example, the ready/standby switching function is ignored.

Magic key functions	Trigger switch operating modes					Auto sensing mode
	Auto-off mode	Momentary switching mode	Alternate switching mode	Continuous reading mode 1	Continuous reading mode 2	
Readable code switching function	√	√	√	√	√	√
Data retransfer function	√	√	√	√	√	√
Specific character transfer function	√	√	√	√	√	√
Ready/standby switching function	--	--	--	√	√	--
Marker mode switching function	√	√	√	√	√	√
Barcode reader mode switching function	√	√	√	√	√	√
No function	√	√	√	√	√	√

In addition to the magic key functions listed above, the magic key has the following functions that are independent of the above ones.

Temporarily canceling the barcode reader mode

Selecting the barcode reader mode (see Chapter 8, Section 8.3) when the USB keyboard interface is used disables both the QR-coded parameter menu and configuration software (ScannerSetting_2D). To enable them, hold down the magic key for approx. 2 seconds to temporarily cancel the barcode reader mode. Completing the parameter modification with the QR-coded parameter menu or configuration software restores the barcode reader mode.

Switching the interface

Turning the scanner on with the magic key being held down switches from the current interface to another one; from USB-COM interface to USB keyboard interface or vice versa.

Completion of switching to the USB-COM interface lights the indicator LED in blue and to the USB keyboard interface, in orange.

The interface setting will be retained even when the power is off.

8.1 Data verification mode

The data verification mode verifies the code data read against the master data stored in the scanner and reports the match status with data output. You can set the verification parameters with the configuration software (ScannerSetting_2D).

There are two ways to register master data--"Preset master registration" and "Scanning master registration." The former refers to registration that you make with the configuration software (ScannerSetting_2D) in advance; the latter can be made by scanning a code label.

8.1.1 Verification setup procedure

(1) Preset master registration

Register the code type and data to be used for verification using the configuration software (ScannerSetting_2D). Up to 99 digits can be registered. The registered data will be sent to the host computer when you scan the "Output master data" code given on page 28.

The registered master data will be preserved even if the scanner is turned off. To clear it, first clear the registered master data stored in the host computer with the configuration software (ScannerSetting_2D) and then send the new setting data to the scanner.

(2) Scanning master registration

Scan a code to be registered as master data in the following way:

1) Place the scanner in the data verification mode and hold down the magic key for approx. 2 seconds. (The indicator LED should light in green.)
2) With the magic key held down, press the trigger switch to read the master code to be registered. (The scanner operates in the trigger switch operating mode currently set.)

During the registration operation above, if the master data has fewer characters than specified (e.g., less than the specified verification start position), the registration operation aborts with an error.

Even if "Preset master registration" has been made, you can make "Scanning master registration." If both "Preset master registration" and "Scanning master registration" have been made, the number of characters to verify that has been set with the "Preset master registration" and the master data that has been set with the "Scanning master registration" will be valid.

The registered data will be sent to the host computer when you scan the "Output master data" code given on page 28.

Note: The registered master data will be cleared when:

- the scanner is turned off,
- you change the parameters of the verification start position or the number of characters to verify, or
- the verification conditions are updated with the configuration software (ScannerSetting_2D), by scanning a batch-process QR Code printout, or by scanning the QR-coded parameter menu.

Note: You can register a code as master data any number of times as long the indicator LED is lit in green by pressing the magic key. The code that is read last becomes the final master data.

Note: If no master data has been entered by either the preset master entry or scanning master entry, the indicator LED flashes in red, during which it is impossible to scan codes.

8.1.2 Specifying a verification object

You can specify two types of verification objects--data string and data block. For data string verification, you specify the verification start position and the number of characters to verify. For data block verification, you specify one of the data blocks delimited by commas in the CSV format.

(1) Data string verification

The scanner verifies data specified by the verification start position and the number of characters to verify against the master data registered in the scanner, and then it outputs the verification result.

The verification start position should be within the range of 1 to 999, and the number of characters to verify, within the range of 1 to 99.

In any of the following cases, the verification results in a mismatch:

1) The verification data in the specified position does not match the master data.
2) The code type which the verification data belongs to is different from the one that the master data belongs to (see the note below).
3) All data specified is not included or no data is included within the specified range.

(Examples)

Master data registered	Verification start position	No. of characters to be verified	Data string read (Verification object)	Result
345	3	3	00**345**	Match
345	3	3	00**345**678	Match
345	3	3	00**34**6	Mismatch
345	3	3	00**34**	Mismatch

(2) Data block verification

If data is saved in the comma-delimited CSV format, the scanner verifies data in the specified data block against the master data registered in the scanner, and then outputs the verification result.

The data block position should be within the range of 1 to 99.

In any of the following cases, the verification results in a mismatch:

1) The verification data in the specified block does not match the master data.
2) The code type which the verification data belongs to is different from the one that the master data belongs to (See the note below).
3) All data specified is not included or no data is included within the specified block.
4) The data block to verify exceeds 99 characters in length

(Examples)

Master data registered	Position of data block to be verified	Data block read (Verification object)	Result
345	3	0,12,**345**,6789	Match
345	3	0,12,**346**,6789	Mismatch
345	3	0,12,**345**6,6789	Mismatch
345	3	0,12,**34**,6789	Mismatch
345	3	0,12	Mismatch

Note: Whether the code ID mark is matched or not is determined not by the combination of code ID marks Type 1 and Type 2 but by Type 1 only (refer to Chapter 10, Section 10.3).

8.1.3 Verification result output

(1) Report of match/mismatch status

You can select any of the following report types using the configuration software (ScannerSetting_2D). Selecting "Disable transmission" reports nothing.

Setting	If there is a match:	If there is a mismatch:
1	Disable transmission.	Disable transmission.
2	Enable code data transmission.	Disable transmission.
3	Enable code data transmission.	Enable NG transmission.
4	Enable OK transmission.	Enable NG transmission.

(2) Beeper, indicator LED and vibrator

You can check whether the verification result is a match or mismatch with the beeper, indicator LED and vibrator.

When the beeper, indicator LED and vibrator are enabled, they act as listed below.

	Beeper	Indicator LED	Vibrator	
			"OK" vibrations	"NG" vibrations
If there is a match:	Emits a short beep.	Lights in blue.	Operates.	--
If there is a mismatch:	Emits a long beep.	Lights in red.	--	Operates.

(3) Scan lock

The scan lock function locks the scanner on standby if the verification result is a mismatch. You can enable or disable this function with the configuration software (ScannerSetting_2D).

Once the scanner is locked, it switches to standby regardless of the current trigger switch control selected. The scanner remains on standby even if the trigger switch is pressed or a ready-to-scan command (R, READON or LON) is received.

Pressing the magic key or turning off the scanner releases the scan lock.

Output of the master data registered

Scanning the "Output master data" QR Code symbol given below lets the scanner output the verification section of master data entered in the verification setup procedure, together with the code ID mark.

"Output master data" code

8.2 Editing data

You can edit and output code data read in the "data extraction mode" or "delimited-text format conversion mode" that is selected in the configuration software (ScannerSetting_2D). The default is "No editing."

Note: In the case of multi-line bar codes, unless all code ID marks read are matched, the data editing process will result in an error regardless of whether or not the data read contains any error. Whether the code ID mark is matched is determined not by the combination of code ID marks Type 1 and Type 2 but by Type 1 only (refer to Chapter 10, Section 10.3).

8.2.1 Data extraction mode

This mode offers three extraction choices--"data string," "data block" and "AI (Application Identifier)-prefixed string" extractions from code data read and then outputs it.

The "data block" extraction is possible only when code data is in the comma-delimited CSV format. The "AI-prefixed string" extraction is available for EAN-128, RSS, and EAN.UCC Composite symbols (excluding linear components in a UPC/EAN Composite symbol).

8.2.1.1 Extracting a data string

The scanner extracts a data string specified by the "Extraction start position" and "Extraction end position" from a code specified by the "Code type" and then outputs it in the data transmission format selected in the scanner (see Chapter 10, Section 10.3). The extraction conditions and extraction start and end positions are listed below.

■ Extraction conditions

Extraction conditions	Choices
"Code type"	Any code
	QR Code
	PDF
	Data Matrix
	MaxiCode
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	EAN-128
	Codabar (NW-7)
	Code 39
	Interleaved 2of5 (ITF)
	RSS
	EAN.UCC Composite symbology
"Data transfer regardless of error result"	Permit/Prohibit

If the scanner fails to extract a data string or scans a code not specified by "Code type" when the "Data transfer regardless of error result" is permitted, then it outputs the data read as is without editing.

■ Extraction start and end positions

"Extraction start position"	"Extraction end position"
Head position	*n*th position
Tail position	
*n*th position	Tail position
	By *n* positions from the start position
	*n*th position

The *n* in "By *n* positions from the start position" can be 1 through 9999. The extraction end position should be equal to or greater than the extraction start position.

Example Code read: QR Code, Data: 12345,
Code ID mark: Type 1, Header: STX, Terminator: ETX, Transmission of the number of digits: Enable, BCC: Disable, Prefix/Suffix: None

Extraction conditions	Extraction start position	Extraction end position	Output data
"Code type": QR Code "Data transfer regardless of error result": Prohibit	Head position	3rd position	[STX]Q0003123[ETX]
	Tail position	3rd position	[STX]Q0003345[ETX]
	1st position	Tail position	[STX]Q000512345[ETX]
	1st position	By 3 positions	[STX]Q0003123[ETX]
	2nd position	4th position	[STX]Q0003234[ETX]
	Head position	6th position	Error
	Tail position	6th position	Error
	6th position	Tail position	Error
	6th position	By 10 positions	Error
	1st position	6th position	Error
"Code type": QR Code "Data transfer regardless of error result": Permit	Head position	6th position	[STX]Q000512345[ETX]
	Tail position	6th position	[STX]Q000512345[ETX]
	6th position	Tail position	[STX]Q000512345[ETX]
	6th position	By 10 positions	[STX]Q000512345[ETX]
	1st position	6th position	[STX]Q000512345[ETX]
"Code type": PDF "Data transfer regardless of error result": Prohibit	Invalid if specified.	Invalid if specified.	Error
"Code type": PDF "Data transfer regardless of error result": Permit	Invalid if specified.	Invalid if specified.	[STX]Q000512345[ETX]

8.2.1.2 Extracting data blocks

If data read is in the comma-delimited CSV format, the scanner extracts data blocks specified by the data block numbers from a code specified by the "Code type" and then outputs it in the data transmission format selected in the scanner (see Chapter 10, Section 10.3). The extraction conditions and data bock numbers are listed below.

■ Extraction conditions

Extraction conditions	Choices
"Code type"	Any code
	QR Code
	PDF
	Data Matrix
	MaxiCode
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	EAN-128
	Codabar (NW-7)
	Code 39
	Interleaved 2of5 (ITF)
	RSS
	EAN.UCC Composite symbology
"Data transfer regardless of error result"	Permit/Prohibit

If the scanner fails to extract a data block or scans a code not specified by "Code type" when the "Data transfer regardless of error result" is permitted, then it outputs the data read as is without editing.

■ Data block numbers

Each data block number should be within the range from 1 through 99. Up to three blocks can be extracted.

Example Code read: QR Code,
Transmission of code ID mark: Disable, Header: STX, Terminator: ETX,
Transmission of the number of digits: Disable, BCC: Disable, Prefix/Suffix: None

Extraction conditions	Data read	Data block numbers	Output data
"Code type": QR Code "Data transfer regardless of error result": Prohibit	1,23,456,7890	1, 2 and 3	[STX]1[ETX][STX]23[ETX][STX]456[ETX]
	1,23,456,7890	3, 1 and 2	[STX]456[ETX][STX]1[ETX][STX]23[ETX]
	1234567890	1	[STX]1234567890[ETX]
	1,,23,456,7890	2 and 5	[STX][ETX][STX]7890[ETX]
	1,23,456,7890	5	Error
	1,23,456,7890	4 and 5	Error
	1234567890	1 and 2	Error
"Code type": QR Code "Data transfer regardless of error result": Permit	1,23,456,7890	5	[STX]1,23,456,7890[ETX]
	1,23,456,7890	4 and 5	[STX]1,23,456,7890[ETX]
	1234567890	1 and 2	[STX]1234567890[ETX]
"Code type": QR Code "Data transfer regardless of error result": Prohibit	1,23,456,7890	Invalid if specified.	Error
"Code type": PDF "Data transfer regardless of error result": Permit	1,23,456,7890	Invalid if specified.	[STX]1,23,456,7890[ETX]

8.2.1.3 Extracting AI (Application Identifier)-prefixed strings

If the scanner reads an EAN-128, RSS, or EAN.UCC Composite symbol (excluding linear components in a UPC/EAN Composite symbol), it edits the data according to AIs and outputs it in the data transmission format selected in the scanner (see Chapter 10, Section 10.3).

The "AI-prefixed string" extraction is available in two modes--AI-delimited mode and AI parenthesizing mode. AIs to be used for data editing are listed in (3) AI table later.

(1) AI-delimited mode

In this mode, the scanner extracts strings prefixed with AIs specified (up to three types of AIs) and separates them with the specified delimiters (selectable from headers/terminators, commas and tabs) instead of AIs to output them.

■ Extraction conditions

Extraction conditions	Choices
"Data transfer regardless of error result"	Permit/Prohibit

If the scanner fails to extract an AI-prefixed string when the "Data transfer regardless of error result" is permitted, it outputs the data read as is without editing.

■ Delimiters

Delimiters can be any of the following three--header/terminator, comma and tab.

- Header/terminator

  Specifying a header/terminator as delimiters prefixes a header and suffixes a terminator to each element string separated.

  A prefix, suffix, the number of digits, and code ID mark can be also added to each element string if their transmissions are enabled. The number of digits is the count of each element string edited.

  Example Data read: (01)94901234567894(11)030808(13)030810
  Code ID mark: Disable, Header: STX, Terminator: ETX,
  Transmission of the number of digits: Enable, BCC: Disable, Prefix/Suffix: None

AIs specified	Output data
01,11,13	[STX]0014949012345678 94[ETX][STX]0006030808[ETX][STX]0006030810[ETX]

- Comma

  Specifying a comma as delimiters outputs comma-delimited data. No comma follows the tail of the data.

  A header and terminator are added to the full string. None of a prefix, suffix, the number of digits, and code ID mark is added even if their transmissions are enabled.

  Example Data read: (01)94901234567894(11)030808(13)030810
  Code ID mark: Disable, Header: STX, Terminator: ETX,
  Transmission of the number of digits: Disable, BCC: Disable, Prefix/Suffix: None

AIs specified	Output data
01,11,13	[STX]94901234567894,030808,030810[ETX]

- Tab (ASCII 09H (HT))

  Specifying a tab as delimiters outputs tab-delimited data. No tab follows the tail of the data.

  A header and terminator are added to the full string. None of a prefix, suffix, the number of digits, and code ID mark is added even if their transmissions are enabled.

  Example Data read: (01)94901234567894(11)030808(13)030810
  Code ID mark: Disable, Header: STX, Terminator: ETX,
  Transmission of the number of digits: Disable, BCC: Disable, Prefix/Suffix: None

AIs specified	Output data
01,11,13	[STX]94901234567894[TAB]030808[TAB]030810[ETX]

Example Data read: (01)94901234567894(11)030808(13)030810(17)040208(17)040305
Code ID mark: Disable, Header: STX, Terminator: ETX, Transmission of the number of digits: Disable, BCC: Disable, Prefix/Suffix: None

Extraction conditions	AIs specified	Delimiter	Output data
"Data transfer regardless of error result": Prohibit	01,11,17	Comma	[STX]94901234567894,030808,040208[ETX]
	17,11		[STX]040208,030808[ETX]
	17,17		[STX]040208,040305[ETX]
	12		Error
	01,12		Error
	01,01		Error
	01,11,17		[STX]94901234567894,030808,040208[ETX]
"Data transfer regardless of error result": Permit	17,11		[STX]040208,030808[ETX]
	17,17		[STX]040208,040305[ETX]
	12		[STX]019490123456789411030808130308101704020817040305[ETX]
	01,12		
	01,01		

(Note 1) Element strings will be output in the order of AIs specified.

(Note 2) If data read contains two or more element strings prefixed with the same AI, those element strings will be output in the order arranged in that data read.

(Note 3) If data read does not contain a string prefixed with the specified AI or it contains such data but its number of digits is more or less than the one defined for that AI, an error will result when the "Data transfer regardless of error result" is prohibited.

(2) AI parenthesizing mode

In this mode, the scanner parenthesizes AIs contained in data read and output the edited data according to the extraction conditions.

■ Extraction conditions

Extraction conditions	Choices
"Data transfer regardless of error result"	Permit/Prohibit

If the scanner fails to extract an AI-prefixed element string when the "Data transfer regardless of error result" is permitted, it outputs the data read as is without editing.

Example Code ID mark: Disable, Header: STX, Terminator: ETX, Transmission of the number of digits: Disable, BCC: Disable, Prefix/Suffix: None

Extraction conditions	Data read	Output data
"Data transfer regardless of error result": Prohibit	01949012345678941103080813030 81017040208	[STX](01)94901234567894(11)030808(13)03 0810(17)040208[ETX]
	01949012345678941103080813030 810617040208170403 05	Error (Note 1)
"Data transfer regardless of error result": Permit	01949012345678941103080813030 81017040208	[STX](01)94901234567894(11)030808(13)03 0810(17)040208[ETX]
	01949012345678941103080813030 810617040208170403 05	[STX]01949012345678941103080813030 810617040208170403 05[ETX]

(Note 1) Data from the head to element string 030810 prefixed with AI (13) can be normally extracted, but the following data (as underlined below) causes an error since it starts with 6 that cannot start any AI.

(01)94901234567894(11)030808(13)030810617040208170403 05

(3) AI table

In the AI-prefixed string extraction, the scanner edits data according to the Application Identifiers (AIs) defined below.

AI	Format	Description
00	n2+n18	Serial Shipping Container Code (SSCC)
01	n2+n14	Global Trade Item Number (GTIN)
02	n2+n14	GTIN of Trade Items Contained in a logistic unit (For Use with AI 37 Only)
03	n2+n14	Reserved.
04	n2+n16	Reserved.
10	n2+an..20	Batch or Lot Number
11	n2+n6	Production Date (YYMMDD) (*)
12	n2+n6	Due Date (YYMMDD) (*)
13	n2+n6	Packaging Date (YYMMDD) (*)
15	n2+n6	Best Before Date (YYMMDD) (*)
17	n2+n6	Expiration Date (YYMMDD) (*)
20	n2+n2	Product Variant
21	n2+an..20	Serial Number
22	n2+an..29	HIBCC (Health Industry Business Communication Council)--Quantity, Date, Batch, and Link
23n	n3+n..19	Batch or Lot Number (Transitional Use) (**)
240	n3+an..30	Additional Product Identification Assigned by the Manufacturer
241	n3+an..30	Customer Part Number
250	n3+an..30	Secondary Serial Number
251	n3+an...30	Reference to Source Entity
252	n3+n27	Global Serial Number
30	n2+n..8	Quantity
310n	n4+n6	Net Weight, Kilograms
311n	n4+n6	Length or 1st Dimension, Meters
312n	n4+n6	Width, Diameter, or 2nd Dimension, Meters
313n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Meters
314n	n4+n6	Area, Square Meters (***)
315n	n4+n6	Volume, Liters (***)
316n	n4+n6	Volume, Cubic Meters (***)
320n	n4+n6	Net Weight, Pounds (***)

AI	Format	Description
321n	n4+n6	Length or 1st Dimension, Inches (***)
322n	n4+n6	Length or 1st Dimension, Feet (***)
323n	n4+n6	Length or 1st Dimension, Yards (***)
324n	n4+n6	Width, Diameter, or 2nd Dimension, Inches (***)
325n	n4+n6	Width, Diameter, or 2nd Dimension, Feet (***)
326n	n4+n6	Width, Diameter, or 2nd Dimension, Yards (***)
327n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Inches (***)
328n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Feet (***)
329n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Yards (***)
330n	n4+n6	Gross Weight, Kilograms (***)
331n	n4+n6	Length or 1st Dimension, Meters, Logistics (***)
332n	n4+n6	Width, Diameter, or 2nd Dimension, Meters, Logistics (***)
333n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Meters, Logistics (***)
334n	n4+n6	Area, Square Meters, Symbology (***)
335n	n4+n6	Gross Volume, Liters (***)
336n	n4+n6	Gross Volume, Cubic Meters (***)
337n	n4+n6	Kilograms per Square Meter (pressure) (***)
340n	n4+n6	Gross Weight, Pounds (***)
341n	n4+n6	Length or 1st Dimension, Inches, Logistics (***)
342n	n4+n6	Length or 1st Dimension, Feet, Logistics (***)
343n	n4+n6	Length or 1st Dimension, Yards, Logistics (***)
344n	n4+n6	Width, Diameter, or 2nd Dimension, Inches, Logistics (***)
345n	n4+n6	Width, Diameter, or 2nd Dimension, Feet, Logistics (***)
346n	n4+n6	Width, Diameter, or 2nd Dimension, Yards, Logistics (***)
347n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Inches, Logistics (***)
348n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Feet, Logistics (***)
349n	n4+n6	Depth, Thickness, Height, or 3rd Dimension, Yards, Logistics (***)
350n	n4+n6	Area, Square Inches (***)
351n	n4+n6	Area, Square Feet (***)
352n	n4+n6	Area, Square Yards (***)
353n	n4+n6	Area, Square Inches, Logistics (***)
354n	n4+n6	Area, Square Feet, Logistics (***)

AI	Format	Description
355n	n4+n6	Area, Square Yards, Logistics (***)
356n	n4+n6	Net Weight, Troy Ounces (***)
357n	n4+n6	Net Volume, Ounces (***)
360n	n4+n6	Volume, Quarts (***)
361n	n4+n6	Volume, Gallons (***)
362n	n4+n6	Gross Volume, Quarts (***)
363n	n4+n6	Gross Volume, Gallons (***)
364n	n4+n6	Volume, Cubic Inches (***)
365n	n4+n6	Volume, Cubic Feet (***)
366n	n4+n6	Volume, Cubic Yards (***)
367n	n4+n6	Gross Volume, Cubic Inches (***)
368n	n4+n6	Gross Volume, Cubic Feet (***)
369n	n4+n6	Gross Volume, Cubic Yards (***)
37	n2+n..8	Quantity (For Use with AI 02 Only)
390n	n4+n15	Amount Payable--Single Monetary Area
391n	n4+n3+n15	Amount Payable and ISO Currency Code
392n	n4+n15	Amount Payable for a Variable Measure Trade Item--Single Monetary Area
393n	n4+n3+n15	Amount Payable for a Variable Measure Trade Item and ISO Currency Code
400	n3+an..30	Customer's Purchase Order Number
401	n3+an..30	Consignment Number
402	n3+n17	Shipment Identification Number
403	n3+an..30	Routing Code
410	n3+n13	Ship to (Deliver to) EAN.UCC Global Location Number
411	n3+n13	Bill to (Invoice to) EAN.UCC Global Location Number
412	n3+n13	Purchased from EAN.UCC Global Location Number
413	n3+n13	Ship for (Deliver for) EAN.UCC Global Location Number
414	n3+n13	Identification of a Physical Location--EAN.UCC Global Location Number
415	n3+n13	EAN.UCC Global Location Number of the Invoicing Party
420	n3+an..20	Ship to (Deliver to) Postal Code Within a Single Postal Authority
421	n3+n3+an..9	Ship to (Deliver to) Postal Code with Three-Digit ISO Country Code Prefix
422	n3+n3	Country of Origin of a Trade Item

AI	Format	Description
423	n3+n15	Country of Initial Processing
424	n3+n3	Country of Processing
425	n3+n3	Country of Disassembly
426	n3+n3	Country of Final Processing
43	n2+n4+n7+an..10+n1	Carrier Assigned Tracking Number
7001	n4+n13	NATO Stock Number (NSN)
7002	n4+an..30	UN/ECE Meat Carcasses and Cuts Classification
7030	n4+n3+an..27	Approval Number of Processor with Three-Digit ISO Country Code, Butchery
7031	n4+n3+an..27	Approval Number of Processor with Three-Digit ISO Country Code, 1st Processing Place
703n	n4+n3+an..27	Approval Number of Processor with Three-Digit ISO Country Code, 2nd to 9th Processing Places
8001	n4+n14	Roll Products--Width, Length, Core Diameter, Direction, and Splices
8002	n4+an..20	Cellular Mobile Telephone Identifier
8003	n4+n14+an..16	EAN.UCC Global Returnable Asset Identifier (GRAI)
8004	n4+an..30	EAN.UCC Global Individual Asset Identifier (GIAI)
8005	n4+n6	Price Per Unit of Measure
8006	n4+n14+n2+n2	Identification of the Component of a Trade Item
8007	n4+an30	International Bank Account Number (IBAN)
8008	n4+n6+n6	Date and Time of Production (YYMMDDHHMMSS)
8018	n4+n18	EAN.UCC Global Service Relation Number (GSRN)
8020	n4+an25	Payment Slip Reference Number
8100	n4+n1+n5	UPC Coupon Extended Code--Number System Character and Offer Code
8101	n4+n1+n5+n4	UPC Coupon Extended Code--Number System Character, Offer Code, and End of Offer Code
8102	n4+n1+n1	UPC Coupon Extended Code--Number System Character Preceded by Zero
90	n2+an..30	FACT Data Identifiers
91	n2+an..30	Company Internal Information--Company
92	n2+an..30	Company Internal Information--Company
93	n2+an..30	Company Internal Information--Company
94	n2+an..30	Company Internal Information--Company
95	n2+an..30	Company Internal Information--Carrier

AI	Format	Description
96	n2+an..30	Company Internal Information--Carrier
97	n2+an..30	Company Internal Information--Company
98	n2+an..30	Company Internal Information--Company
99	n2+an..30	Company Internal Information

(*) To indicate only year and month, DD must be filled with "00."

(**) n indicates the length of data.

(***) n indicates the decimal point position.

a	Alphabetic characters
a3	3 alphabetic characters, fixed length
a..3	Up to 3 alphabetic characters
n	Numeric characters
n3	3 numeric characters, fixed length
n..3	Up to 3 numeric characters
an	Alphanumeric characters
an3	3 alphanumeric characters, fixed length
an..3	Up to 3 alphanumeric characters

(Note 1) If the specified AI is variable in length and the number of digits in data read is less than the maximum number of digits defined for the AI, GS (1Dh) contained in data read will be output.

8.2.2 Delimited-text format conversion mode

In this mode, the scanner splits data read from the code specified by "Code type" at the positions of commas, CRs, LFs, CRLFs and TABs contained in the data and outputs it in the data transmission format selected in the scanner (see Chapter 10, Section 10.3).

■ Conversion conditions

Conversion conditions	Choices
"Code type"	Any code
	QR Code
	PDF
	Data Matrix
	MaxiCode
	UPC-A/EAN-13
	UPC-E
	EAN-8
	Code 128
	EAN-128
	Codabar (NW-7)
	Code 39
	Interleaved 2of5 (ITF)
	RSS
	EAN.UCC Composite symbology
"Data transfer regardless of error result"	Permit/Prohibit

Example Code read: PDF417, Data: 12,34[CR]56[TAB][CR]78,
Code ID mark: Disable, Header: STX, Terminator: ETX,
Transmission of the number of digits: Disable, BCC: Disable, Prefix/Suffix: None

Conversion conditions	Output data
"Code type": PDF417 "Data transfer regardless of error result": Prohibit or Permit	[STX]12[ETX][STX]34[ETX][STX]56[ETX][STX][ETX][STX]78[ETX]
"Code type": QR Code "Data transfer regardless of error result": Prohibit	Error
"Code type": QR Code "Data transfer regardless of error result": Permit	[STX]12,34[CR]56[TAB][CR]78[ETX]

Note: In the case of multi-line bar codes, unless all code ID marks read are matched, the data editing process will result in an error regardless of whether or not the data read contains any error. Whether the code ID mark is matched is determined not by the combination of code ID marks Type 1 and Type 2 but by Type 1 only (refer to Chapter 10, Section 10.3).

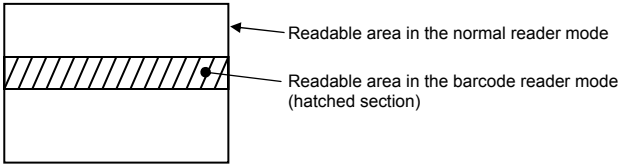
8.3 Barcode reader mode

The barcode reader mode limits the vertical readable area to 15% at the center portion, as shown below, and the skew angle within the range of $6° \geq \theta \geq -6°$.

In this mode, the scanning time required is shorter than that in the normal reader mode.

However, the scanner cannot read 2D codes or multi-line bar codes. The barcode reader mode and the point scan mode (see Section 8.4) cannot be enabled concurrently. The one set last will be enabled.

Selecting the barcode reader mode when the USB keyboard interface is used disables the QR-coded parameter menu and configuration software. To enable them, hold down the magic key for approx. 2 seconds to temporarily cancel the barcode reader mode. (See Chapter 7.)



8.4 Point scan mode

In the point scan mode, you can aim at a target code by matching up the center spot of the marker beam with that code.

If there is no code at that center spot or the scanner cannot detect the marker beam due to high levels of ambient lighting, the scanner cannot read anything. The point scan mode takes effect only when the marker is permitted to light.

The point scan mode and the barcode reader mode (see Section 8.3) cannot be enabled concurrently. The one set last will be enabled.

8.5 Scanning a mirror image 2D code

If you enable the mirror image scanning with the QR-coded parameter menu or the configuration software (ScannerSetting_2D), the scanner can scan a mirror image 2D code as well as a normal image. Note that when the mirror image scanning is enabled, the time required for scanning may increase.

8.6 Scanning a black-and-white inverted code

The scanner usually scans a black-and-white normal code (black cells/bars on a white background). You can switch the scanner to scan a black-and-white inverted code (white cells/bars on a black background) or to scan both types of codes while automatically identifying them, using the QR-coded parameter menu or the configuration software (ScannerSetting_2D).

Note that the automatic detection scanning may take more time than normal code or inverted code scanning.

A black-and-white inverted code requires a black quiet zone of more than the number of cells defined in the code specifications.

8.7 Scanning split QR Code symbols

QR Code symbology can split data into a maximum of 16 blocks and encode each of them into a split QR Code symbol (model 1 or 2). Split QR Code scanning is possible only with the same QR Code model.

The scanner can scan split QR Code symbols and restore them to the original data string in edit mode, batch edit mode, and non-edit mode, which you can select using the QR-coded parameter menu.

Edit mode

The scanner accumulates and edits split QR Code symbols read and then sends the edited data to the host computer. If the total data volume of split QR Code symbols exceeds 8 kilobytes, a read error will result and the accumulated data will be discarded.

Batch edit mode

If all the split QR Code symbols to be scanned lie within the readable area, the scanner reads them all once and then edits and sends them to the host computer.

Non-edit mode

Each time a single split QR Code symbol is read, the scanner sends the data read to the host computer.

When scanning split QR Code symbols, the scanner beeps in a different way from usual. That is, when the scanner reads the first split code, it beeps twice and enters the split code scanning mode. When the scanner completes the sequence of split code scanning, it beeps three times.

Note: If you scan any non-split QR Code symbol or a code other than a QR Code midway through a sequence of split QR Code scanning, the scanner cancels the split code scanning, discards the split QR Code symbols already scanned, and sends the code scanned last.

Note: If the scanner switches to standby in auto-off mode (after approx. 5 seconds of holding down the trigger switch or by releasing the trigger switch within 5 seconds) or the split code scanning interval exceeds approx. 3 seconds, then the scanner discards the data scanned and cancels the split code scanning sequence.

Note: If you scan a split code of any other QR Code before completion of the current scanning sequence, the scanner discards the data already scanned and starts a new scanning sequence.

8.8 Multi-line barcode scanning

The scanner can scan up to 3 lines of bar codes in the readable area at any one time. You can specify the number of lines to be scanned, the data output order and output format using the configuration software (ScannerSetting_2D).

8.8.1 Number of lines

The number of lines allowed for multi-line barcode scanning is 2 or 3. This setting is essential.

8.8.2 Data output order

You can specify the data output order by designating code types*[1], heading characters*[2], or the number of digits to be scanned*[3].

*[1] Code types should be selected from readable bar codes you enable. This setting is essential.

*[2] Up to two heading characters can be specified. If a question mark (?) is specified, it acts as a wild card. This setting can be omitted.

*[3] The number of digits to be scanned varies depending upon the code type. This setting is essential.

8.8.3 Output format

You may select either the header/terminator- or comma-delimited output format.

(1) Header/terminator-delimited output format

Specifying this format allows the scanner to output multiple lines of barcode data in succession in the data transmission format selected (see Section 10.3) so that the headers and terminators act as delimiters. For UPC and EAN codes, the number of digits will be omitted.

(2) Comma-delimited output format

Specifying this format allows the scanner to output multiple lines of barcode data delimited with commas in the data transmission format selected (see Section 10.3). Note that the scanner outputs the code ID mark specified for the first line barcode and the number of digits including the delimiter commas. The number of digits will not be omitted even for UPC and EAN codes.

Note 1: Bar code types specified for multi-line barcode scanning cannot be read individually.

Note 2: In the point scan mode or barcode reader mode, the scanning conditions specified for multi-line barcode scanning are invalid so that the scanner scans codes individually.

Note 3: The scanner cannot read multi-line barcodes of UPC/EAN with add-on.

Note 4: If linear components in a UPC/EAN Composite symbol are specified for multi-line barcode scanning, EAN.UCC Composite symbols including the specified linear components cannot be read.

8.9 Scanning an SQRC (Security QR Code) Symbol

SQRC is a QR code with scanning restrictions. SQRC comes in the form of disclosed and undisclosed data. Scanning of undisclosed data is possible only if the encryption key set in the scanner matches. In order to perform SQRC scanning, it is necessary to either permit scanning of SQRC only, or to permit scanning of SQRC and QR codes. (Note)

With the SQRC scanning enabled, the parameters for “Encryption key mismatch” and “Encryption key match” can be selected with the configuration software.

Note: Encryption key setting is necessary in order to perform SQRC scanning. In order to set an encryption key(s), dedicated SQRC scan setting software (SQRC Setting) is required.

Chapter 9 Beeper, Indicator LED, Vibrator and Marker Beam

9.1 Beeper

(1) Beeping

The scanner emits a short or long beeps, once or a couple of times as described below.

The beeper emits **a short beep** when:

- the scanner has read a code successfully,
- code data read matches the master data in the data verification mode,
- the scanner has read a split QR code,
- data transfer is started by the data retransfer function or specific character transfer function,
- readable codes are switched by the readable code switching function, or
- the "Start setting" or "End setting" code is read (3 beeps) or the parameter setting QR Code symbols are read (1 beep) from the QR-coded parameter menu (given in Chapter 13),
- the configuration software (ScannerSetting_2D) starts up or accepts new settings (3 beeps),
- the scanner has read a batch-process QR Code symbol generated with the configuration software (ScannerSetting_2D) (3 beeps), or
- the barcode reader mode is restored after temporarily canceled (1 beep slightly longer).

The beeper emits **a long beep** when:

- code data read does not match the master data in the data verification mode,
- the scanner has read split QR codes in the edit mode to the point that the accumulated data exceeds 8 kilobytes,
- a master code has the wrong number of digits during registration of master data,
- a code other than a parameter setting code is read during parameter setting by the QR-coded parameter menu,
- a transmission error or timeout occurred when the scanner was communicating with the configuration software (ScannerSetting_2D),
- a communications error has occurred,
- an invalid control command is received, or
- the previously sent data is not available at the time of data retransfer (using the magic key).
- the encryption key of data read does not match the one configured in the scanner in SQRC scanning (when the "data transmission after mismatch of encryption key" is disabled).

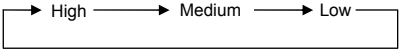
You can disable the beeper using the QR-coded parameter menu or configuration software (ScannerSetting_2D). In any of the following cases, however, the beeper sounds regardless of that beeper setting:

- when you make settings by scanning the QR-coded parameter menu,
- when the scanner receives a beeper-ON command from the host computer,
- when the configuration software (ScannerSetting_2D) starts up or any setting you have made is established,
- when the scanner reads a batch-process QR Code symbol, and
- when the parameter values are saved by a PW command (refer to Appendix 2).

(2) Adjusting the beeper volume

You can adjust the beeper volume to three levels--high, medium and low--using the QR-coded parameter menu or configuration software (ScannerSetting_2D). The factory default is High.

Each time the "Beeper volume" QR Code symbol is read, the beeper volume cycles as shown below.



Even if the scanner is turned off, this setting will be retained.

9.2 Indicator LED

The indicator LED lights or flashes in blue, green, red or orange as described below.

The indicator LED lights **in blue** when:

- the scanner has read a code successfully,
- the "Start setting" or "End setting" code is read from the QR-coded parameter menu (given in Chapter 13),
- the scanner starts or ends a sequence of split QR Code scanning,
- the scanner has read a split QR Code symbol, or
- the parameter values are saved by a PW command (refer to Appendix 2).

The indicator LED lights **in green** when:

- data transfer is started by the data retransfer function,
- the scanner has read a code successfully with the readable code switching function or barcode reader mode switching function enabled,
- data transfer is started by the specific character transfer function, or
- you hold down the magic key for approx. 2 seconds to make the scanner ready to accept registration of a master code, or
- the barcode reader mode is temporarily canceled.

The indicator LED lights **in red** when:

- a send/receive error or command error has occurred,
- code data read does not match the master data in the data verification mode,
- a master code has the wrong number of digits during registration of master data,
- the data retransfer function failed to transfer data,
- a code other than a parameter setting code is read during parameter setting by the QR-coded parameter menu,
- you press the magic key that has been disabled by a control command (refer to Appendix 2) specifying any trigger switch operating mode other than continuous reading modes 1 and 2 even though the ready/standby switching function has been assigned to the magic key, or
- the scanner is locked due to a mismatch in the data verification mode.

The indicator LED **flashes in red** when:

- no master data has been registered in the data verification mode.

The indicator LED lights **in blue and orange** alternately when:

- you switch between two readable codes using the switching function,
- you switch between the normal reader mode and barcode reader mode using the barcode reader mode switching function, or
- you switch between the USB-COM interface and USB keyboard interface by turning the scanner on with the magic key being held down.

You can disable the indicator LED with the QR-coded parameter menu or configuration software (ScannerSetting_2D). Regardless of such setting, however, the indicator LED comes on when:

- the scanner is being customized with the QR-coded parameter menu,
- the scanner receives an LED-ON command (LB, LG or LR) from the host computer (refer to Appendix 2),
- the configuration software (ScannerSetting_2D) starts up or any setting is newly established,
- the scanner reads a batch-process QR Code symbol,
- the parameter values are saved by a PW command (refer to Appendix 2),
- a master code is being registered or the registration is completed,
- any error has occurred during registration of a master code,
- the verification result is a mismatch, the scanner is locked or no master data has been registered in the data verification mode,
- data transfer has been completed or there is no previous data to be retransferred using the data retransfer function,
- data transfer has been completed by the specific character transfer function,
- the setting status of the readable code switching function is displayed,
- you press the magic key that has been disabled by a control command (refer to Appendix 2) specifying any trigger switch operating mode other than continuous reading modes 1 and 2 even though the ready/standby switching function has been assigned to the magic key,
- the setting status of the barcode reader mode switching function is displayed, and
- a hardware error has occurred.

9.3 Vibrator

The QR-coded parameter menu and configuration software (ScannerSetting_2D) provide three configuration choices: indicating successful scanning (OK), indicating an error (NG), and disabled.

The OK setting uses the vibrator to indicate the following.

- Successful transmission of the bar code data just read
- In data verification mode, a match between the bar code data just read and a master data entry
- In data verification mode, successful entry of master data
- Scanning of a split QR Code symbol
- In batch edit mode, successful transmission of a split QR Code sequence
- End of data transmission started by the retransfer or specific character transfer function
- Change in list of readable codes
- Scanning of "Start setting," "End setting," or parameter setting code from the QR-coded parameter menu (given in Chapter 13)
- Start or end of parameter setting with the configuration software (ScannerSetting_2D)
- Scanning of a batch-process QR Code symbol generated with the configuration software (ScannerSetting_2D)
- the barcode reader mode is restored after temporarily canceled

The NG setting uses the vibrator to indicate the following.

- Wrong number of digits in data for new master data entry
- In data verification mode, failure to find a match in the master data for the bar code data just read
- In edit mode, a split QR Code sequence containing over 8 kilobytes of data
- Failure to find a match in the master data for the split QR Code sequence just read
- Detection of a code other than a parameter setting one during a parameter setting sequence using the QR-coded parameter menu
- Data transmission failure: CTS at "L" level
- No ACK response received in the ACK/NAK mode
- Invalid control command (See Appendix 2)
- No data to resend (See the data retransfer function in Chapter 6)
- Timeout or other communications error during parameter setting with the configuration software (ScannerSetting_2D)

Note: It is recommended that the vibrator be disabled when the scanner is stationary to a stand.

9.4 Marker beam

The red marker beam (semiconductor laser) comes on to indicate the scanning area as a guide.

The marker provides a choice of the three modes--Normal marker mode, marker-OFF mode and marker-ON mode that can be selected by using the QR-coded parameter menu or the configuration software (ScannerSetting_2D).

(1) Normal marker mode

The following description assumes that "Marker" is specified for the halfway position of the trigger switch and "Scan" for the fully depressed position.

When the trigger switch is in auto-off mode:

Holding down the trigger switch halfway turns on the marker beam for approx. 30 seconds. When the scanner is ready to scan (that is, within approx. 5 seconds from the full depression of the trigger switch or until completion of reading from that), the marker beam remains on. If you release the trigger switch when the scanner is ready, the marker beam will go off.

When the trigger switch is in momentary switching mode or alternate switching mode:

In the momentary switching mode, holding down the trigger switch halfway turns on the marker beam for a maximum of 30 seconds.

When the scanner is ready to scan (that is, while the trigger switch is fully held down in the momentary switching mode or when the scanner is ready to scan in the alternate switching mode), the marker beam remains on. When the scanner is on standby (that is, the trigger switch is released in the momentary switching mode or when the scanner is on standby in the alternate switching mode), the marker beam will go off.

When the trigger switch is in continuous reading mode 1 or 2:

Turning the scanner on activates the marker and keeps it on.

If the scanner receives the Z, READOFF or LOFF command, it turns off the marker beam; if it receives the R, READON or LON command, it keeps the marker beam on.

When the trigger switch is in auto sensing mode

When the scanner senses a code coming into the readable area and becomes ready to scan, it automatically turns on the marker beam. After approx. 3 seconds from completion of scanning or if scanning is not completed within approx. 3 seconds, the scanner switches to standby and turns off the marker beam.

(2) Marker-OFF mode

The marker beam will not come on under any conditions.

(3) Marker-ON mode

When the scanner switches to standby, the marker beam is turned on for approx. 30 seconds.

When it is ready to scan, the marker beam remains on.

Chapter 10 Communication

This scanner is compliant with USB 1.1 (Universal Serial Bus Specification Revision 1.1).

10.1 USB-COM interface

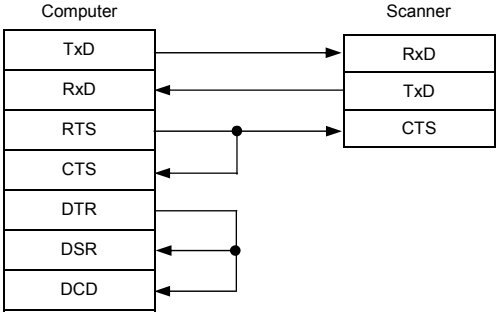
Installing the dedicated USB-COM device driver to the host computer allows the USB-COM interface to operate in communications applications using the conventional serial port.

■ Notes for use

- In Windows 2000/XP, if you connect the scanner to your computer first time or have changed the COM port for the scanner or hub, then confirm the COM port number on the Windows device manager or the like before use.
- Windows 98SE/Me will automatically assign the COM port number according to the OS specifications so that the port number cannot be fixed. This may cause the COM port number to be changed at the time of next rebooting of the host computer if (1) you have connected the scanner to the COM port first time or (2) you have changed the configuration as given below:

  - Changing the number of the scanner units connected to the COM ports
  - Changing the COM port to which the scanner or hub is connected.

  In such a case, reboot the host computer, open the device manager, and check the COM port number actually assigned by OS before use.
- If you want to use two or more communications processors (software) or scanners concurrently on your computer, be sure to assign a unique COM port number to each of them.
- If the host computer switches to the suspend mode when any communications software is running and recovers from that suspend mode, the software may freeze in some computers. Quit and restart the software.
- It is not necessary to make settings such as transmission speed, data bits, parity, and stop bits (which are required for communications software using a conventional serial port) since the USB interface ignores those settings. The flow control should be set to "Hardware (RTS/CTS)" or "None."
- The virtual COM port on the computer and the scanner are connected with each other as shown below.



■ Communications protocol

You can select either non-acknowledge mode or ACK/NAK mode.

Non-acknowledge mode (default)

If the CTS signal is at a high level (Enable transmission), the scanner transmits code data read.

Note: The configuration software (ScannerSetting_2D) provides a choice of CTS timeout settings from 100 ms to 9.9 s in 100-ms increments and two CTS signal control choices Yes and No.

ACK/NAK mode

If the CTS signal is at high level (Enable transmission), the scanner transmits code data read. After that, the scanner waits for and then processes a response. If the response is an ACK, the scanner normally ends the transmission; if it is a NAK, the scanner transmits the code data again.

Note: The configuration software (ScannerSetting_2D) provides a choice of CTS timeout and ACK/NAK response time settings each from 100 ms to 9.9 s in 100-ms increments.

10.2 USB keyboard interface

The USB keyboard interface requires no dedicated device driver. Data read by the scanner can be entered to the cursor position in your application.

The USB keyboard interface operates in conformity with the following:

- Universal Serial Bus (USB) Device Class Definition for Human Interface Devices (HID) Version 1.11
- Universal Serial Bus (USB) HID Usage Tables Version 1.11 keyboard

(1) CAPS Lock state

Select the CAPS Lock ON or OFF to match the state of the connected keyboard. (Default: CAPS Lock OFF)

(2) Keyboard type

Select the type of the connected keyboard. (Default: Type 101, US English)

(3) Numeric data transmission format

Select the "inboard numeric keys" or "numeric keypad" on the connected keyboard. (Default: Inboard numeric keys)

(4) Binary conversion

Select the conversion type to be applied to data read, from the following:

- "No conversion" (ASCII) (default) : Outputs 00h to 7Fh data in ASCII format bytewise. Selecting this parameter does not output 80h to FFh data.
- "Binary conversion" : Converts 00h to FFh data to binary format and outputs it bytewise.
- "Kanji conversion" : Converts 00h to FFh data to Shift-JIS format and outputs it, two bytes at a time. If there is any data to which this Kanji conversion cannot apply, it converts such data to binary format and outputs it bytewise instead.

Note that some applications may fail to output converted data as it is displayed.

(5) Data transmission interval

Select the data transmission interval to be applied when the scanner sends data read to the host computer. There are seven choices from 3 ms to 100 ms (default: 10 ms).

10.3 Communication format

Select one of the following two data transmission formats.

Header	Code ID mark	Prefix	No. of digits				Code data	Suffix	Terminator	BCC
			n1	n2	n3	n4				

Header	Prefix	Code ID mark	No. of digits				Code data	Suffix	Terminator	BCC
			n1	n2	n3	n4				

(1) Header/Terminator

The following choices are available.

USB-COM interface

Header: None (default) or STX
Terminator: CR (default), LF, CR/LF or ETX

USB keyboard interface

Header: None (default), TAB, ESC, ENTER or others
Terminator: None, TAB, ESC, ENTER (default) or others

For details, refer to Chapter 12.

(2) Prefix/Suffix

A prefix or suffix consists of up to eight ASCII characters (00h to FFh). You can set a prefix or suffix with the configuration software (ScannerSetting_2D). (Default: No prefix or suffix)

(3) BCC

The Block Character Check (BCC) exclusive-ORs all bits at the same bit level in characters following the header and preceding the terminator in a transmission block to generate a horizontal parity byte to be transferred in a binary code. The BCC can be enabled or disabled. If no header is prefixed or the USB keyboard interface is selected, no BCC will be transferred.

(4) Code ID mark

This optional field specifies the code system. It offers four combinations with two code ID marks (Type 1 and Type 2) and two output modes (coupling and separating) as listed below.

You can also select whether or not to transmit the code ID mark. (Default: No transmission)

Code type				Code ID mark			
				Type 1		Type 2 (Note 1)	
				Coupling	Separating	Coupling	Separating
2D codes	QR Code			Q		]Qm	
	Split QR Code	In edit mode		Q		]Qm	
		In batch edit mode		Q		]Qm	
		In non-edit mode		S		S (Note 2)	
	MicroQR Code			Q		Q (Note 2)	
	SQRC			Q		Q (Note 2)	
	MaxiCode			X		]Um	
	PDF417			Y		]L0	
	Data Matrix	Square		Z		]dm	
		Rectangular		Z		]dm	
Bar codes	UPC-A	Without add-on		A		]X0	
		With 2-digit add-on	Linear component	A		]X3	]X0
			Add-on	None		None	]X1 (Note 3)
		With 5-digit add-on	Linear component	A		]X3	]X0
			Add-on	None		None	]X2 (Note 2)
	UPC-E	Without add-on		C		]X0	
		With 2-digit add-on	Linear component	C		]X3	]X0
			Add-on	None		None	]X1 (Note 3)
		With 5-digit add-on	Linear component	C		]X3	]X0
			Add-on	None		None	]X2 (Note 3)
	EAN-13	Without add-on		A		]E0	
		With 2-digit add-on	Linear component	A		]E3	]E0
			Add-on	None		None	]E1 (Note 3)
		With 5-digit add-on	Linear component	A		]E3	]E0
			Add-on	None		None	]E2 (Note 3)
	EAN-8	Without add-on		B		]E4	
		With 2-digit add-on	Linear component	B		]E5	]E4
			Add-on	None		None	]E1 (Note 3)
		With 5-digit add-on	Linear component	B		]E6	]E4
			Add-on	None		None	]E2 (Note 3)
	Interleaved 2of5			I		]Im	
	Code 39			M		]Am	
	Codabar (NW-7)			N		]Fm	
	Code 128			K		]Cm	

Code type					Code ID mark			
					Type 1		Type 2 (Note 1)	
					Coupling	Separating	Coupling	Separating
Bar codes	EAN-128				W		]C1	
	RSS-14, RSS-14 Truncated, RSS-14 Limited, RSS-14 Stacked, RSS Expanded, RSS-14 Omnidirectional, RSS Expanded Stacked				R		]e0	
EAN.UCC Composite symbols	RSS (Note 4) CC-A RSS (Note 4) CC-B		RSS		V	R	]e0	
			CC-A, CC-B		None	Y (Note 3)	None	
	UPC-A CC-A, UPC-A CC-B	UPC-A	Without add-on		V	A	]X0	
			With 2-digit add-on	Linear component	V	A	]X3	]X0
				Add-on	None	None	None	]X1 (Note 3)
			With 5-digit add-on	Linear component	V	A	]X3	]X0
				Add-on	None	None	None	]X2 (Note 3)
		CC-A, CC-B			None	Y (Note 3)	]e0 (Note 3)	
	EAN-13 CC-A, EAN-13 CC-B	EAN-13	Without add-on		V	A	]E0	
			With 2-digit add-on	Linear component	V	A	]E3	]E0
				Add-on	None	None	None	]E1 (Note 3)
			With 5-digit add-on	Linear component	V	A	]E3	]E0
				Add-on	None	None	None	]E2 (Note 3)
		CC-A, CC-B			None	Y (Note 3)	]e0 (Note 3)	
	UPC-E CC-A, UPC-E CC-B	UPC-E	Without add-on		V	C	]X0	
			With 2-digit add-on	Linear component	V	C	]X3	]X0
				Add-on	None	None	None	]X1 (Note 3)
			With 5-digit add-on	Linear component	V	C	]X3	]X0
				Add-on	None	None	None	]X2 (Note 3)
		CC-A, CC-B			None	Y (Note 3)	]e0 (Note 3)	
	EAN-8 CC-A, EAN-8 CC-B	EAN-8	Without add-on		V	B	]E4	
			With 2-digit add-on	Linear component	V	B	]E5	]E4
				Add-on	None	None	None	]E1 (Note 3)
			With 5-digit add-on	Linear component	V	B	]E6	]E4
				Add-on	None	None	None	]E2 (Note 3)
		CC-A, CC-B			None	Y (Note 3)	]e0 (Note 3)	
	EAN-128 CC-A, EAN-128 CC-B, EAN-128 CC-C	EAN-128			V	W	]e0	
		CC-A, CC-B, CC-C			None	Y (Note 3)	None	

(Note 1) Type 2 is a code ID mark system compliant with the AIM USA "Guidelines on Symbology Identifiers." The m" suffix is a modifier character that differs depending upon options of individual symbologies as defined below.

Code Type		"m" (Modifier character)	Options
2D codes	QR Code	0	Model 1
		1	Model 2
		3	Model 2, ECI protocol not implemented, FNC1 implied in first position
	MaxiCode	0	mode 4, mode 5
		1	mode 2, mode 3
	Data Matrix	1	ECC-200
		2	ECC-200 (FNC1 in the 1st or 5th character position from start code)
		3	ECC-200 (FNC1 in the 2nd or 6th character position from start code)
Bar codes	Interleaved 2of5	0	Scanning enabled, without a check digit
		1	Scanning enabled, with a check digit (Check digit transmission enabled)
		3	Scanning enabled, with a check digit (Check digit transmission disabled)
	Code 39	0	Scanning enabled, without a check digit
		1	Scanning enabled, with a check digit (Check digit transmission enabled)
		3	Scanning enabled, with a check digit (Check digit transmission disabled)
	Codabar	0	Scanning enabled, without a check digit
		1	Scanning enabled, with a check digit (Check digit transmission enabled)
		3	Scanning enabled, with a check digit (Check digit transmission disabled)
	Code 128	0	No FNC1 in the 1st and 2nd character positions from start code
		2	FNC1 in the 2nd character position from start code

Example: The code ID mark for Interleaved 2of5 with option "Scanning enabled, with a check digit (Check digit transmission disabled)" is]I3.

]: Flag character (ASCII 93h)
I: Code character (Interleaved 2of5)
3: Modifier character (See the table above.)

(Note 2) For code ID marks not compliant with the AIM USA "Guidelines on Symbology Identifiers," same characters as ones defined in Type 1 apply.

(Note 3) These code ID marks are contained in code data.

(Note 4) RSS represents: RSS-14, RSS-14 Truncated, RSS-14 Limited, RSS-14 Stacked, RSS Expanded, RSS-14 Stacked Omnidirectional, and RSS Expanded Stacked.

(5) Number of digits

This optional field specifies whether or not to transmit the number of digits (4 bytes) in code data or disables the transmission (default). Note that UPC and EAN codes (except EAN-128) skip this field.

n1 : thousands (0 to 9)
n2 : hundreds (0 to 9)
n3 : tens (0 to 9)
n4 : units (0 to 9)

(6) Code data

The data format for each symbology is described below.

QR Code/MicroQR Code

Code data read will be transmitted as is.

Split QR Code

In edit mode and batch edit mode: The scanner edits code data read and then transmits it. It does not transmit the code number, number of splits, or parity.

In non-edit mode: The scanner transmits the code number, the number of splits, parity, and code data read. The code number and the number of splits are 1 byte each and the parity, 2 bytes in hexadecimal format.

SQRC

The data content is transmitted.
If the scanner is set to transmit only the undisclosed data in the encryption key match setting, transmission is limited to undisclosed data only and no other data is transferred.

$X_1\ X_2\ X_3\ X_4\ X_5\ Y_1\ Y_2\ Y_3\ Y_4\ Y_5$

X_n : Disclosed data
Y_m : Undisclosed data

Transmission of disclosed data + undisclosed data

$X_1\ X_2\ X_3\ X_4\ X_5\ Y_1\ Y_2\ Y_3\ Y_4\ Y_5$

Transmission of undisclosed data only

$Y_1\ Y_2\ Y_3\ Y_4\ Y_5$

PDF417, MicroPDF, MaxiCode and Data Matrix

Code data read will be transmitted as is.

UPC-A

$0\ S\ X_1\ X_2\ X_3\ X_4\ X_5\ X_6\ X_7\ X_8\ X_9\ X_{10}$ C/D

S: Number system character

You can select whether or not to transmit a check digit.

UPC-A with add-on

With 2-digit add-on:
$0\ S\ X_1\ X_2\ X_3\ X_4\ X_5\ X_6\ X_7\ X_8\ X_9\ X_{10}$ C/D $X_{11}\ X_{12}$

With 5-digit add-on:
$0\ S\ X_1\ X_2\ X_3\ X_4\ X_5\ X_6\ X_7\ X_8\ X_9\ X_{10}$ C/D $X_{11}\ X_{12}\ X_{13}\ X_{14}\ X_{15}$

S: Number system character
$X_{11\text{-}15}$: Add-on code data

You can select whether or not to transmit a check digit. A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 2 " and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (4) Code ID mark on pages 53 to 55.)

UPC-E

X_1 X_2 X_3 X_4 X_5 X_6 C/D

You can select whether or not to transmit a check digit.

UPC-E with add-on

With 2-digit add-on:

X_1 X_2 X_3 X_4 X_5 X_6 C/D X_7 X_8

With 5-digit add-on:

X_1 X_2 X_3 X_4 X_5 X_6 C/D X_7 X_8 X_9 X_{10} X_{11}

S: Number system character
$X_{7\text{-}11}$: Add-on code data

You can select whether or not to transmit a check digit. A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 2 " and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (4) Code ID mark on pages 53 to 55.)

EAN-13

Y_1 Y_2 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D

Y*n*: Flag number characters

You can select whether or not to transmit a check digit.

EAN-13 with add-on

With 2-digit add-on:

Y_1 Y_2 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12}

With 5-digit add-on:

Y_1 Y_2 X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 X_{10} C/D X_{11} X_{12} X_{13} X_{14} X_{15}

Y*n*: Flag number characters

$X_{11\text{-}15}$: Add-on code data

You can select whether or not to transmit a check digit. A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 2 " and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (4) Code ID mark on pages 53 to 55.)

EAN-8

Y_1 Y_2 X_1 X_2 X_3 X_4 X_5 C/D

Y*n*: Flag number characters

You can select whether or not to transmit a check digit.

EAN-8 with add-on

With 2-digit add-on:

Y_1 Y_2 X_1 X_2 X_3 X_4 X_5 C/D X_6 X_7

With 5-digit add-on:

Y_1 Y_2 X_1 X_2 X_3 X_4 X_5 C/D X_6 X_7 X_8 X_9 X_{10}

Y*n*: Flag number characters

$X_{6\text{-}10}$: Add-on code data

You can select whether or not to transmit a check digit. A code ID mark precedes add-on code data under the conditions "Code ID mark: Type 2 " and "Code ID mark output mode: Separating." (For details about the code ID mark, refer to (4) Code ID mark on pages 53 to 55.)

Code 39

Code data read will be transmitted as is.

You can select whether or not to transmit start and stop codes ("*").

Interleaved 2of5

The scanner transmits code data read, starting from the character following the start code to the one preceding the stop code. No start/stop codes will be transmitted.

Codabar (NW-7)

The scanner transmits code data read including the start/stop codes. You can select whether or not to transmit start/stop codes.

Code 128 (EAN-128)

The scanner transmits code data read, starting from the character following the start code to the one preceding the check digit. Start/stop codes, FNC codes, or check digit will not be transmitted. Note that FNC1 placed in character positions other than the 1st and 2nd ones from the start code will be converted to GS (1Dh) and transferred.

RSS (RSS-14, RSS-14 Truncated, RSS Limited, RSS-14 Stacked, RSS Expanded, RSS-14 Stacked Omnidirectional, RSS Expanded Stacked)

Code data read will be transmitted as is.

RSS Composite symbols

Code data read will be transmitted as is.

Under the conditions "Code ID mark: Type 1 " and "Code ID mark output mode: Separating," a separator (GS: 1Dh) and 2D code ID mark are inserted between the linear component and 2D Composite component. (For details about the code ID mark, refer to (4) Code ID mark on pages 53 to 55.)

Under the conditions "Code ID mark: Type 2 " and "Linear component length (RSS/EAN-128): Variable," a separator (GS: 1Dh) is inserted between the linear component and 2D Composite component.

UPC/EAN Composite symbols

Code data read will be transmitted as is.

You can select whether or not to transmit a check digit of the linear component (UPC/EAN).

Under the conditions "Code ID mark: Type 1 " and "Code ID mark output mode: Separating," a separator (GS: 1Dh) and 2D code ID mark are inserted between the linear component and 2D Composite component.

Under the conditions "Code ID mark: Type 2 ," the 2D code ID mark is inserted between the linear component and 2D Composite component. (For details about the code ID mark, refer to (4) Code ID mark on pages 53 to 55.)

Chapter 11 Image Capturing

11.1 Outline

The scanner supports image capturing that allows you to capture a graphic as a bitmap (BMP) or JPEG image and output it to the host computer. The JPEG image offers three quality choices--standard, high, and low.

The image size can be selected from standard VGA, 1/4 VGA and 1/16 VGA. If you select 1/4 VGA or 1/16 VGA, select also the output image area--the full image area or the center portion of the image area. When the full image area is selected, the scanner thins out the resolution of the full image area by skipping every other pixel so that the image quality becomes low; when the center portion is selected, the scanner extracts the center portion of the image area so that the visual area becomes smaller but the image quality does not change.

The scanner can also output a thumbnail to help you aim at a target. The thumbnail images can be saved as a BMP or JPEG image in 1/64 VGA or 1/4 VGA, respectively.

You can select the output format, image size, output image area and whether or not to use a thumbnail by modifying the parameters of the IMAGEOUT command.

Note: Selecting the USB keyboard interface disables the image capturing function.

11.2 Image capturing specifications

(1) Output file format

BMP or JPEG file format

(2) Image size and output image area

Image size	Number of pixels	BMP	JPEG	Image output area
Standard VGA	640 x 480	√	√	Full image area
1/4 VGA	320 x 240	√	√	Full or center portion of the image area
1/16 VGA	160 x 120	√	√	Full or center portion of the image area
Thumbnail (1/64 VGA)	80 x 60	√	--	Full image area
Thumbnail (1/4 VGA)	320 x 240	--	√	Full image area

(3) Communications protocol for image transmission

Xmodem 1K

(4) Image output command

IMAGEOUT#1#m#n Enable the thumbnail transmission
IMAGEOUT#1#m#n#o Disable the thumbnail transmission

The selections available for parameters l, m, n and o are as follows:

l: Output file format

B	BMP
J or J0	JPEG (Medium)
J1	JPEG (High)
J2	JPEG (Low)

m: Image size

0	Standard VGA
2	1/4 VGA
4	1/16 VGA

n: Image output area

F	Full image area
C	Center portion of the image area

o: Thumbnail

0	Disable thumbnail transmission
1	Enable thumbnail transmission of BMP images in 1/64 VGA
2	Enable thumbnail transmission of JPEG images in 1/4 VGA

(5) Image capturing operation

1) Upon receipt of an IMAGEOUT command, the scanner captures an image, beeps three times, and switches to the image transmission mode (Xmodem 1K protocol).

2) When the thumbnail is enabled:

   The scanner transmits a thumbnail (BMP file in 1/64 VGA or JPEG file in 1/4 VGA) repeatedly.

   Pressing the trigger switch causes the scanner to beep once, capture an image, and start transmission (Xmodem 1K protocol).

   When the thumbnail is disabled:

   The scanner immediately captures an image and transmits it in the format specified by IMAGEOUT parameters (Xmodem 1K protocol).

3) Upon completion of transmission, the scanner beeps once and exits the image transmission mode.

(6) Notes

- Image transmission can only be command-controlled; it cannot be started by the QR-coded parameter menu.
- When the scanner is in the image transmission mode, it cannot scan bar codes or 2D codes. The protocol is fixed to the Xmodem 1K.
- Parameters of the IMAGEOUT command should be uppercase or numerical ASCII characters.
- Transmission condition settings such as header, terminator and transmission speed for the image transmission are the same as those for ordinary commands.
- Transmission speed and other conditions when the Xmodem 1K protocol is used are the same as those with the normal communications protocol (non-acknowledge mode or ACK/NAK mode).
- Upon completion of image transmission, the scanner returns to the normal communications protocol (non-acknowledge mode or ACK/NAK mode).
- In a JPEG file format, images are compression-converted, so the image quality may be lower.

(7) Image transmission time required (Typical)

The table below lists the typical image transmission time required from image capturing to conversion and transmission under the following conditions: Xmodem 1K and 115200 bps. However, this may vary according to the settings made in the host computer.

Image size	Output file format	Image file size	Image transmission time
Standard VGA	BMP	302 KB	15.5 sec.
1/4 VGA	BMP	77 KB	4.2 sec.
1/16 VGA	BMP	20 KB	1.2 sec.
Thumbnail (1/64 VGA)	BMP	6 KB	0.5 sec.
Thumbnail (1/4 VGA)	JPEG	4.8 KB	0.5 sec.
Standard VGA	JPEG	25 KB*	1.9 sec.

* In a JPEG file format, images will be compression-converted, so the file size may vary, depending on images scanned (approx. 10 to 40 KB, usually 25 KB). No compression ratio can be specified.

Chapter 12 Parameters and Defaults

The tables below list the parameters and their default values. You can change them using the QR-coded parameter menu or configuration software (ScannerSetting_2D). Note that shadowed parameters can only be set in the configuration software (ScannerSetting_2D).

When the scanner leaves the factory, all of these parameters are set to defaults.

(1) Interface to the host

Items	Parameters	Defaults	Refer to:
Interface	USB-COM interface	√	Chapter 10
	USB keyboard interface (See Note 1.)		

(Note 1) Selecting the USB keyboard interface disables the configuration software.

(2) Communications parameters for USB-COM interface

The following settings take effect only when the USB-COM interface is set up.

Items	Parameters	Defaults	Refer to:
Communications protocol	Non-acknowledge mode	√	Section 10.1
	ACK/NAK mode		
Header	None	√	Section 10.3, (1)
	STX		
Terminator	ETX		
	CR	√	
	LF		
	CR LF		
Transmission of BCC	Enable		Section 10.3, (3)
	Disable	√	
CTS signal control	Yes		Section 10.1
	No	√	
CTS signal timeout	0.1 to 9.9 seconds	2 s	Section 10.1
ACK/NAK response time	0.1 to 9.9 seconds	1 s	

: Can be changed only with the configuration software.

(3) Communications parameters for USB keyboard interface

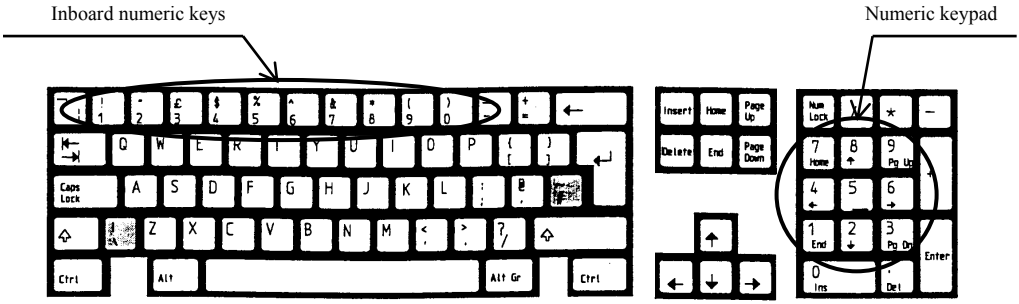
The following settings take effect only when the USB keyboard interface is set up.

Items	Parameters	Defaults	Refer to:
Caps Lock	OFF (Lowercase letter)	√	Section 10.2 (1) (See Note 1.)
	ON (Uppercase letter)		
Keyboard type	U.S. English (101 key type)	√	Section 10.2 (2)
	Germany (102 key type)		
	French (102 key type)		
	U.K. English (102 key type)		
	Italian (102 key type)		
	Swedish (102 key type)		
	Japanese (106 key type)		
Numeric data transmission format (0 to 9)	Inboard numeric keys	√	(See Note 3.)
	Numeric keypad		
Binary conversion (See Note 2.)	No conversion (ASCII)	√	Section 13.2
	Binary conversion		
	Kanji conversion		
Data transmission interval	3 ms		Section 10.2 (3)
	6 ms		
	10 ms	√	
	16 ms		
	30 ms		
	50 ms		
	100 ms		

(Note 1) Select the Caps Lock state which matches that of the connected keyboard.

(Note 2) Some applications cannot output data correctly on the display.

(Note 3) When selecting the numeric keypad for the numeric data transmission format, set the host's NUM LOCK to ON.



U.S. English (101 key type)

: Can be changed only with the configuration software.

Items	Parameters	Defaults	Refer to:
Header	None	√	Section 10.3 (1)
	STX		
	ETX		
	CR		
	LF		
	CR LF		
	TAB		
	ESC		
	ENTER		
	Right Ctrl		
	←		
	↑		
	→		
	↓		
	User-defined		
Terminator	None		
	STX		
	ETX		
	CR		
	LF		
	CR LF		
	TAB		
	ESC		
	ENTER	√	
	Right Ctrl		
	←		
	↑		
	→		
	↓		
	User-defined		

(4) Reading modes

Items	Parameters	Defaults	Refer to:
Scanning modes	Regular read mode	√	Section 8.1
	Data verification mode (Scan lock disabled)		
	Data verification mode (Scan lock enabled)		
Data editing	No editing	√	Section 8.2
	Data extraction mode		
	Delimited-text format conversion mode		
Barcode reader mode	Enable (Barcode reader mode)		Section 8.3
	Disable (Normal reader mode)	√	
Point scan mode	Enable		Section 8.4
	Disable	√	

(5) Data transmission format

Items	Parameters	Defaults	Refer to:
Prefix transmission	Enable		Section 10.3, (2)
	Disable	√	
Suffix transmission	Enable		
	Disable	√	
Code ID mark transmission	Enable		Section 10.3
	Disable	√	
Code ID mark position	Before prefix		Section 10.3
	After prefix	√	
Code ID mark	Type 1	√	Section 10.3, (4)
	Type 2		
Code ID mark output mode	Coupling	√	Section 10.3, (4)
	Separating		
Transmission of the number of digits (not applicable to UPC/EAN codes)	Enable		Section 10.3, (5)
	Disable	√	

: Can be changed only with the configuration software.

(6) 2D codes, mirror image and black-and-white inverted codes

Items	Parameters	Defaults	Refer to:
Scanning mirror image 2D codes	Enable		Section 8.5
	Disable	√	
Scanning black-and-white inverted codes	Black cells/bars on a white background	√	Section 8.6
	White cell/bars on a black background		
	Automatically identify black and white inverted codes		
Scanning split QR Code	Edit mode	√	Section 8.7
	Batch edit mode		
	Non-edit mode		
Scanning MicroQR Code	Enable		Section 13.2
	Disable	√	
Scanning PDF417	Enable	√	
	Disable		
Scanning MicroPDF	Enable		
	Disable	√	
Scanning MaxiCode	Enable	√	
	Disable		
Scanning Data Matrix (Square)	Enable	√	Section 13.2 (See Note 1.)
	Disable		
Scanning Data Matrix (Rectangular)	Enable	√	
	Disable		
QR Code, min. version readable	1 to 40	1	Section 13.2 (See Note 2.)
QR Code, max. version readable		40	
MicroQR, min. version readable	1 to 4	1	
MicroQR, max. version readable		4	
Data Matrix (Square), min. code number readable	1 to 24	1	
Data Matrix (Square), max. code number readable		24	
Data Matrix (Rectangular), min. code number readable	1 to 6	1	
Data Matrix (Rectangular), max. code number readable		6	

(Note 1) Using the QR-coded parameter menu enables or disables scanning of both Square and Rectangular Data Matrix symbols at the same time.

(Note 2) The parameter setting ranges are different from versions or code numbers that the scanner can actually read.

: Can be changed only with the configuration software.

Items	Parameters	Defaults	Refer to:
Reading SQRC	Enable (SQRC and QR Code symbols)		Section 8.9
	Enable (SQRC symbol only)		
	Disable	√	
Encryption key mismatch	Reading prohibited	√	
	Enable transmission of disclosed data only		
Encryption key match	Enable transmission of disclosed data + undisclosed data	√	
	Enable transmission of undisclosed data only		

(7) Bar codes

UPC-A/E, EAN-13/8

Items	Parameters	Defaults	Refer to:
Scanning UPC-A and EAN-13	Enable	√	Section 13.2
	Disable		
Scanning UPC-E	Enable	√	
	Disable		
Scanning EAN-8	Enable	√	
	Disable		
Transmission of a check digit for UPC-A	Enable	√	Section 13.2
	Disable		
Transmission of a check digit for EAN-13	Enable	√	
	Disable		
Transmission of a check digit for UPC-E	Enable	√	
	Disable		
Transmission of a check digit for EAN-8	Enable	√	
	Disable		
Scanning UPC/EAN with add-on	Enable (No. of add-on digits not restricted)		
	Enable, 2-digit add-on only		
	Enable, 5-digit add-on only		
	Disable	√	

: Can be changed only with the configuration software.

Interleaved 2of5

Items	Parameters	Defaults	Refer to:
Scanning Interleaved 2of5	Enable, without a check digit	√	Section 13.2
	Enable, with a check digit (Check digit transmission enabled)		
	Enable, with a check digit (Check digit transmission disabled)		
	Disable		
Min. number of digits to scan for Interleaved 2of5	2 to 99 digits	4 digits	(See Note 1.)
Max. number of digits to scan for Interleaved 2of5		99 digits	

Codabar (NW-7)

Items	Parameters	Defaults	Refer to:
Scanning Codabar (NW-7)	Enable, without a check digit	√	Section 13.2
	Enable, with a check digit (Check digit transmission enabled)		
	Enable, with a check digit (Check digit transmission disabled)		
	Disable		
Min. number of digits to scan for Codabar (NW-7)	3 to 99 digits (including start/stop codes)	4 digits	(See Note 1.)
Max. number of digits to scan for Codabar (NW-7)		99 digits	
Transmission of start/stop codes for Codabar (NW-7)	Enable	√	Section 13.2
	Disable		

Code 39

Item	Parameters	Defaults	Refer to:
Scanning Code 39	Enable, without a check digit	√	Section 13.2
	Enable, with a check digit (Check digit transmission enabled)		
	Enable, with a check digit (Check digit transmission disabled)		
	Disable		
Min. number of digits to scan for Code 39	1 to 99 digits (excluding start/stop codes)	1 digit	(See Note 1.)
Max. number of digits to scan for Code 39		99 digits	
Transmission of start/stop codes for Code 39	Enable		Section 13.2
	Disable	√	

(Note 1) The parameter setting ranges are different from the numbers of digits that the scanner can actually read.

: Can be changed only with the configuration software.

Code 128, EAN-128

Items	Parameters	Defaults	Refer to:
Scanning Code 128	Enable	√	Section 13.2 (See Note 2.)
	Disable		
Scanning EAN-128	Enable	√	
	Disable		
Min. number of digits to scan for Code 128 and EAN-128	1 to 99 digits (excluding start/stop codes and 1-digit check digit)	1 digit	(See Note 1.)
Max. number of digits to scan for Code 128 and EAN-128		99 digits	

(Note 1) The setting ranges are different from the numbers of digits that the scanner can actually read.

(Note 2) Using the QR-coded parameter menu enables or disables scanning of both Code 128 and EAN-128 at the same time.

RSS, Composite symbols

Items	Parameters	Defaults	Refer to:
Scanning RSS-14, RSS-14 Truncated, RSS-14 Limited, RSS Expanded	Enable		Section 10.3
	Disable	√	
Scanning RSS-14 Stacked, RSS-14 Stacked Omnidirectional, RSS Expanded Stacked	Enable		
	Disable	√	
Scanning Composite symbols	Enable		
	Disable	√	
Scanning RSS Composite with CC-A	Enable		
	Disable	√	
Scanning RSS Composite with CC-B	Enable		
	Disable	√	
Scanning UPC/EAN Composite with CC-A	Enable		
	Disable	√	
Scanning UPC/EAN Composite with CC-B	Enable		
	Disable	√	
Scanning EAN-128 Composite with CC-A	Enable		
	Disable	√	
Scanning EAN-128 Composite with CC-B	Enable		
	Disable	√	
Scanning EAN-128 Composite with CC-C	Enable		
	Disable	√	

: Can be changed only with the configuration software.

Multi-line barcode scanning

Items	Parameters	Defaults	Refer to:
Scanning multi-line bar codes	Enable		Section 8.8
	Disable	√	
Number of lines for multi-line barcode scanning	2 lines	√	
	3 lines		
Output format for multi-line bar codes	Header/terminator-delimited		
	Comma-delimited	√	
Code type for the 1st line	Selectable from readable bar codes	Not specified.	
Heading characters for the 1st line	Up to 2 ASCII characters	Not specified.	
Min. number of digits to be scanned for the 1st line	Max. 99 digits	Not specified.	
Max. number of digits to be scanned for the 1st line	Max. 99 digits	Not specified.	
Code type for the 2nd line	Selectable from readable bar codes	Not specified.	
Heading characters for the 2nd line	Up to 2 ASCII characters	Not specified.	
Min. number of digits to be scanned for the 2nd line	Max. 99 digits	Not specified.	
Max. number of digits to be scanned for the 2nd line	Max. 99 digits	Not specified.	
Code type for the 3rd line	Selectable from readable bar codes	Not specified.	
Heading characters for the 3rd line	Up to 2 ASCII characters	Not specified.	
Min. number of digits to be scanned for the 3rd line	Max. 99 digits	Not specified.	
Max. number of digits to be scanned for the 3rd line	Max. 99 digits	Not specified.	

: Can be changed only with the configuration software.

(8) Trigger switch control/Magic key control

Items	Parameters	Defaults	Refer to:
Trigger switch control	Auto-off mode	√	Section 6.1
	Momentary switching mode		
	Alternate switching mode		
	Continuous reading mode 1		
	Continuous reading mode 2		
	Auto sensing mode		Section 6.4
Trigger switch function for the fully depressed position	None		Section 6.2
	Scan	√	
	Marker beam		
Trigger switch function for the halfway position	None		Section 6.2
	Scan	√	
	Marker beam		
Scanner sensibility level in auto sensing mode	High		Section 6.4
	Medium	√	
	Low		
Magic key control	Data retransfer function		Chapter 7
	Specific character transfer function		
	Readable code switching function		
	Marker mode switching function		
	Ready/standby switching function		
	Barcode reader mode switching function		
	No function	√	

(9) Beeper, indicator LED, marker beam and vibrator

Items	Parameters	Defaults	Refer to:
Beeper	Enable	√	Section 9.1
	Disable		
Beeper volume	High	√	
	Medium		
	Low		
Indicator LED	Enable	√	Section 9.2
	Disable		
Marker beam	Marker-OFF mode		Section 9.4
	Normal marker mode	√	
	Marker-ON mode		
Vibrator	"OK" vibrations	√	Section 9.3
	"NG" vibrations		
	Disable		

: Can be changed only with the configuration software.

(10) Data verification conditions and data editing conditions

Items	Parameters	Defaults	Refer to:
Verification object in data verification mode	Data string	√	Section 8.1
	Data block		
Verification start position for data string verification	001 to 999 positions (Specify with ASCII characters)	1	
Number of characters to verify for data string verification (Preset master registration not made)	01 to 99 positions (Specify with ASCII characters)	99	
Position of data block to verify for data block verification	01 to 99 positions (Specify with ASCII characters)	1	
Verification result output (Report of match/mismatch status)	Disable transmission/ Disable transmission	√	
	Enable code data transmission/ Disable transmission		
	Enable code data transmission/ Enable NG transmission		
	Enable OK transmission/ Enable NG transmission		
Code type in data editing	Selectable from codes available	Any code (Note 1)	Section 8.2
Data transfer regardless of error result in data editing	Permit		
	Prohibit	√	
Data extraction mode	"Data string" extraction	√	
	"Data block" extraction		
	"AI-prefixed string" extraction		
"Data string" extraction - Extraction start position	Head position		
	Tail position		
	Position *n*	√	
"Data string" extraction - Extraction end position	Tail position	√	
	Position *n*		
	By *n* positions from the start position		
"Data string" extraction - Specification of position *n* for extraction start position	0001 to 9999 positions (Specify with ASCII characters)	1	
"Data string" extraction - Specification of position *n* or *n* positions for extraction end position	0001 to 9999 positions (Specify with ASCII characters)	9999	
"Data block" extraction - Data block numbers (Max. 3 blocks)	01 to 99 positions (Specify with ASCII characters)	Not specified.	
"AI-prefixed string" extraction	AI-delimited mode	√	
	AI parenthesizing mode		
AI-delimited mode - Availability of AI #1	Enable		
	Disable	√	
AI-delimited mode - Availability of AI #2	Enable		
	Disable	√	

(Note 1) Selecting "Any code" edits all types of codes.

: Can be changed only with the configuration software.

Items	Parameters	Defaults	Refer to:
AI-delimited mode - Availability of AI #3	Enable		Section 8.2
	Disable	√	
AI-delimited mode - AI #1	Selectable from AI candidates (Note 2)	00	
AI-delimited mode - AI #2	Selectable from AI candidates (Note 2)	00	
AI-delimited mode - AI #3	Selectable from AI candidates (Note 2)	00	
Delimiters in AI-delimited mode	Header/Terminator	√	
	Comma		
	Tab		
Transmission of ERROR command at the time of scanning failure	Enable		
	Disable	√	

(Note 2) For details about AI candidates, refer to Chapter 8, Section 8.2.1.3, "(3) AI table."

: Can be changed only with the configuration software.

Chapter 13 QR-Coded Parameter Menu

13.1 Parameter setting procedure using the QR-coded parameter menu

Start setting	Use the scanner to scan the "Start setting" QR Code symbol.
↓ The beeper sounds three times.	
Scan parameter setting QR Code symbols.	Scan necessary parameter setting QR Code symbols.
↓	
End setting	Scan the "End setting" QR Code symbol.
The beeper sounds three times.	

Scanning the "All defaults" QR Code symbol in the QR-coded parameter menu makes all items in the menu revert to the factory defaults.

TIP: "Beeper volume" QR Code symbol in the QR-coded parameter menu

The beeper volume can be set even if the above procedure is omitted. No "Start setting" or "End setting" QR Code symbol is required to be scanned.

Each time the "Beeper volume" QR Code symbol is scanned, the beeper volume cycles through High, Medium and Low. The factory default is High.

13.2 QR-coded parameter menu

■ **Menu control (Starting/Ending the Setting Procedure and Reverting to Defaults)**

Start setting

Start setting
(When the "White code on black background" is set)"

Cancel

All defaults

End setting

The beeper volume can be set by scanning the following QR Code symbol only. No "Start setting" or "End setting" QR Code symbol required to be scanned.

Adjusting the beeper volume

Scanning this QR Code symbol cycles the beeper volume through High, Medium and Low. The factory default is High.

Beeper volume

■ **Interface to the host**

USB-COM interface
(default)

USB keyboard
interface

■ Communications parameters for USB-COM interface

Communications protocol (USB-COM interface)

Non-acknowledge mode
(default)

ACK/NAK mode

Header (USB-COM interface)

None (default)

STX

Terminator (USB-COM interface)

ETX

CR (default)

LF

CR LF

Transmission of BCC (USB-COM interface)

Disable (default)

Enable

■ **Communications parameters for USB keyboard interface**

Conversion to binary data

No conversion (default)
(ASCII)

Binary conversion

Kanji conversion

Header (USB keyboard interface)

None (default)

STX

ETX

CR

LF

CR LF

TAB

ESC

ENTER

Right Ctrl

Header (USB keyboard interface)

←

↑

→

↓

Terminator (USB keyboard interface)

None

STX

ETX

CR

LF

CR LF

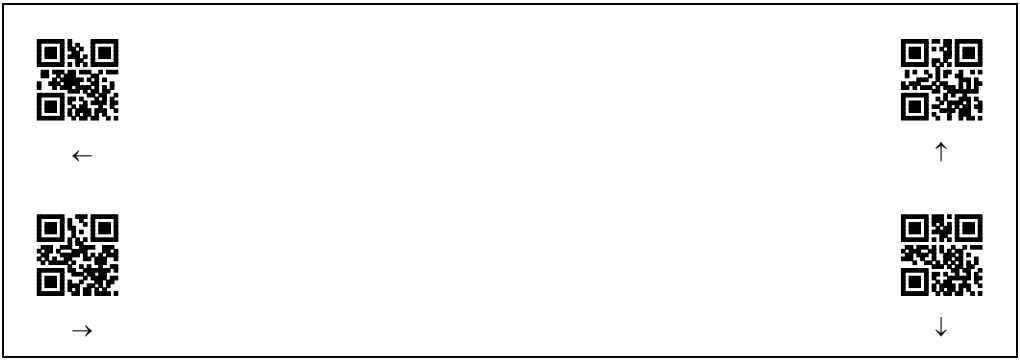
TAB

ESC

ENTER (default)

Right Ctrl

Header (USB keyboard interface)



■ **Data transmission format**

Transmission of code ID mark

Transmission of the number of digits

■ **2D codes, mirror image and black-and-white inverted codes**

Scanning MicroQR Code

Disable (default)

Enable

Scanning black-and-white inverted codes

Black cells/bars on a white background (default)

White cells/bars on a black background

Automatically identify black and white inverted codes

Scanning split QR Code ("Structured Append")

Edit mode (default)

Non-edit mode

Batch edit mode

Scanning PDF417

Disable

Enable (default)

Scanning MaxiCode

Disable

Enable (default)

Scanning Data Matrix

Disable

Enable (default)

■ **Bar codes**

Scanning UPC-A, UPC-E, EAN-13 and EAN-8

Disable

Enable (default)

Scanning Interleaved 2of5

Disable

Enable without
a check digit (default)

Enable with a check digit
(Check digit transmission enabled)

Scanning Code 128 (EAN-128)

Disable

Enable (default)

Scanning Codabar (NW-7)

Disable

Enable without a check digit (default)

Enable with a check digit
(Check digit transmission enabled)

Enable with a check digit
(Check digit transmission disabled)

Transmission of start/stop codes for Codabar (NW-7)

Disable

Enable (default)

Scanning Code 39

Disable

Enable without a check digit (default)

Enable with a check digit
(Check digit transmission enabled)

Enable with a check digit
(Check digit transmission disabled)

Transmission of start/stop codes for Code 39

Disable (default)

Enable

■ **Other settings**

Trigger switch control

Auto-off mode (default)

Alternate switching mode

Momentary switching mode

Continuous reading mode 1

Continuous reading mode 2

Auto sensing mode

Beeper control

Disable

Enable (default)

Indicator LED

Disable

Enable (default)

Vibrator

OK vibrations (default)

NG vibrations

Disable

Chapter 14 Troubleshooting

Problem 1: Low reading efficiency.

Probable cause	What to do:
• A target code is not within the scan range of the reading window.	• Bring a code within the scan range.
• The code may be smeared.	• Wipe off the dirt from the code.
• The code may be blurred.	• Use a code clearly printed.

Problem 2: Cannot read 2D codes or bar codes.

Probable cause	What to do:
• The type of the code to be scanned has not been set as a readable code.	• Enable the type of the code to be scanned as a readable code.
• The scanned bar code contains no check digit, while the "Enable, with a check digit" parameter is selected.	• Select the "Enable, without a check digit" parameter.
• The check digit contained in the scanned bar code is wrong.	• Use a correct bar code.

Problem 3: Code data cannot be displayed normally on the computer screen. (USB-COM interface)

Probable cause	What to do:
• The communications conditions of the scanner are different from those of the connected host.	• Change the communications conditions of the scanner to match those of the connected host.
• Any device driver other than our USB-COM device driver may be used.	• Use our USB-COM device driver that is designed for the USB-COM interface.

Problem 4: Code data cannot be displayed normally on the computer screen. (USB keyboard interface)

Probable cause	What to do:
• The keyboard type selected may not match one that is set up in the host computer.	• Select the same keyboard type as one that is set up in the host computer. (You can check the computer's keyboard type by clicking **My Computer** | **Control Panel** | **Keyboard** | **Hardware**.)
• The Caps Lock state selected may not match that of the connected keyboard.	• Select the same Caps Lock state as that of the connected keyboard.
• Any device driver other than the system-supplied driver (USB device class driver for HID) may be used.	• Use the system-supplied driver that is included in Windows 98 or later Operating Systems.
• The computer's keyboard may be held down.	• Do not press the computer's keyboard when scanning codes.

Appendix 1 Specifications

Item			GT10Q-SU/HU GT11Q-SU/HU
Scanning specifications	Readable codes		QR Code (Model 1 and Model 2), MicroQR,SQRC, PDF417, MicroPDF, MaxiCode, Data Matrix, and EAN.UCC Composite symbol EAN-13/8, UPC-A/E, UPC/EAN with add-on, Interleaved 2of5 (ITF), Code 39, Codabar (NW-7), Code 128, EAN-128, and RSS
	Skew angle		360º
	Scanning resolution	GT10Q-SU GT11Q-SU	0.25 mm (9.8 mils) min. for two-dimensional codes 0.15 mm (5.9 mils) min. for bar codes
		GT10Q-HU GT11Q-HU	0.167 mm (6.6 mils) min. for two-dimensional codes 0.125 mm (4.9 mils) min. for bar codes
	Elevation angle (skew)		±35°
	Tilt angle (pitch)		±35°
	Light source		LED (red)
	Reading confirmation		Blue LED, beeper and vibrator
Interface			USB-COM interface, USB keyboard interface
Input power requirements	Operating voltage		5.0 VDC ±5%
	Power consumption (in Auto-off mode)		Max. 500 mA
Environmental conditions	Operating temperature range		0 to 50°C
	Operating humidity range		10 to 90% RH (*[1])
	Storage temperature range		-10 to 60°C
	Storage humidity range		5 to 95 %RH (*[1])
	Ambient illuminance range		Max. 10,000 lux
Dimensions (W) x (D) x (H)			3.2 x 4.1 x 6.5 inches (82 x 103 x 165 mm)
Weight			Approx. 210 g (excluding the cable)

(*[1]) Sharp temperature change, dewing or freezing not allowed, wet-bulb temperature 30°C max.

Appendix 2 Control Commands

Control commands refer to commands that are exchanged between the host computer and the scanner via the communications line.

Some of the control commands that the host computer issues are functionally equivalent to some parameters that can be set with the QR-coded parameter menu (refer to Chapter 12). Control command settings have priority over settings made with the QR-coded parameter menu.

Note that turning off the scanner will clear control command settings so that settings made with the QR-coded parameter menu will take effect unless the PW command is sent to the scanner for saving control command settings into the EEPROM.

If commands other than ones listed below are sent to the scanner, the scanner operation is not assured.

Note: Selecting the USB keyboard interface disables the control commands.

Control Commands	Transfer Direction Scanner ⟷ Host	Function
Z (Note 1) (Note 2)	←	Switch to standby Upon receipt of the Z, READOFF or LOFF command, the scanner switches to standby as long as the trigger switch control is set to continuous reading mode 1 or 2.
READOFF	←	
LOFF	←	
R (Note 1)	←	Ready to scan Upon receipt of the R, READON or LON command, the scanner becomes ready to scan as long as the trigger switch control is set to continuous reading mode 1 or 2.
READON	←	
LON	←	
B1 B2 B3 (Note 3)	←	Sound the beeper Within 100 ms from the receipt of any of B1, B2 and B3 commands, the scanner beeps for the period specified below. B1: Beep for approx. 80 ms B2: Beep for approx. 120 ms B3: Beep for approx. 240 ms Even if the beeping is prohibited or the scanner is on standby, the beeper will be able to sound.
LB (Note 3)	←	Light the blue indicator LED Within 100 ms from the receipt of the LB command, the blue indicator LED lights for approx. 500 ms.
LG (Note 3)	←	Light the green indicator LED Within 100 ms from the receipt of the LG command, the green indicator LED lights for approx. 500 ms.
LR (Note 3)	←	Light the red indicator LED Within 100 ms from the receipt of the LR command, the red indicator LED lights for approx. 500 ms.
VO (Note 3)	←	Drive the vibrator Within 100 ms from the receipt of the VO command, the vibrator operates for approx. 180 ms.

Control Commands	Transfer Direction Scanner ⟷ Host	Function
U1 U2 U3 U4 U5 U6	←	Trigger switch control U1: Auto-off mode U2: Momentary switching mode U3: Alternate switching mode U4: Continuous reading mode 1 U5: Continuous reading mode 2 U6: Auto sensing mode
PW	←	Save parameters This command saves settings made with U1 through U6 commands into the EEPROM. Without the PW command, the scanner will lose settings made with U1 through U6 when it is turned off.
VER	←	Request for software version <Response from the scanner> Ver.n.nn where n.nn is version number (Ex. Ver.1.00)
VERF	←	Request for the parameter setting version This command checks the version of the parameter settings made in the scanner when the scanner is linked with the configuration software (ScannerSetting_2D). <Response from the scanner> Ver.n.nn.mm where n.nn.mm is version number (Ex. Ver.1.00.00) and mm is parameter setting version.
ERROR	→	Scanning failure When the scanner (which is ready to scan) cannot complete scanning and switches to standby, it sends the ERROR command as long as the trigger switch control is set to continuous reading mode 1 or 2. Whether or not to send this command can be selected.
OK	→	Verification match If code data scanned matches master data in data verification mode, the scanner sends this command as long as the OK transmission is enabled for a match.
NG	→	Verification mismatch If code data scanned does not match master data in data verification mode, the scanner sends this command as long as the NG transmission is enabled for a mismatch.
IMAGEOUT	←	Capture image Refer to Chapter 11 for details.

(Note 1) If the scanner receives the R command twice with the reading window being applied to a code (for example, it receives the R command, sends the code data read, and receives the Z and R commands), it will send even the same code data twice. This is because the Z command cancels the duplication prevention processing.

In split QR Code scanning operation, if the scanner receives the Z command and switches to standby before scanning a set of split QR Code symbols, the duplication prevention processing will be canceled. The code data that has been read halfway will be discarded.

The READOFF and LOFF commands produce the same result as the Z command, the READON and LON commands, as the R command.

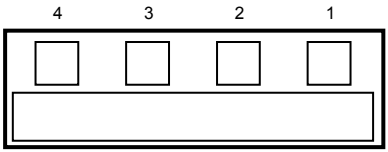
(Note 2) When the scanner is on standby, pressing the trigger switch may light the LEDs momentarily, but the scanner cannot scan codes.

(Note 3) After receipt of one of the B1 through B3, LB, LG, LR and VO command, the scanner may need a maximum of 100 ms to execute the command.

Appendix 3 Interface Specifications

■ USB Interface

Type A USB Connector



Viewed from pin side

Pin No.	Signal
1	5 VDC
2	D-
3	D+
4	GND

2D Code Handy Scanner

GT10Q-SU / GT11Q-SU
GT10Q-HU / GT11Q-HU

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